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THE NEW ZEALAND GEOGRAPHER

CONTENTS OF VOLUME VI, NUMBER 2, OCTOBER 1950

PAGE

Metropolitan Auckland 1740-1945: The Historical Geography of a New Zealand City . . . . . *By L. L. Pownall* 107

Te Kuiti and the Northern King Country: A Region of Agricultural Transition *By James W. Fox* 125

The Takaka Valley, Northwest Nelson . . . *By A. J. Rose* 154

The Development of Communication Lines across the Taranaki Uplands *By W. B. Johnston* 171

Photogeography: The Growth of a City; Auckland 1840-1950 . . 190

New Zealand Geographical Society: Branch Affairs . . . 198

Geographic Notebook 200

In Our Contemporaries 204

Reviews 208

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GEOGRAPHIC NOTEBOOK

PAGE
Contributors to this Issue 200
Land Use: A World Inventory 200
A Clarification of Terms 201
M.A. Theses in Geography 202
Two New Maps 202
Integral Part of New Zealand 203

IN OUR CONTEMPORARIES

1. *In New Zealand Journals . . .*

The Coastline of Mid-Canterbury . . . *By Maxwell Gage* 204
Forests and the Future . . . . *By A. W. Smith* 205

2. *In Overseas Journals . . .*

A Methodologic Viewpoint . . . *By L. L. Pownall* 206

REVIEWS

Ralph Piddington. An Introduction to Social Anthropology, Vol. 1 *By S. Musgrove* 208
A. H. Reed. The Story of Canterbury . . *By Murray McCaskill* 209
Roger Duff. The Moa-Hunter Period of Maori Culture . *By V. F. Fisher* 210
H. S. Gibbs, A. D. Mercer and T. W. Collie. Soils and Agriculture of Westland, N.Z. . . . . . *By Murray McCaskill* 211
Commonwealth Scientific and Industrial Research Organisation. The Australian Environment . . . . *By R. K. Wilson* 212
D. E. Barry Martin. A Concise Introduction to Town and Country Planning *By L. L. Pownall* 213
United Nations. The Question of Establishing United Nations Research Laboratories 214
Demographic Yearbook 214
Otis W. Freeman and H. F. Raup. Essentials of Geography . . 215
Vernor C. Finch and Glenn T. Trewartha. Elements of Geography, Physical and Cultural . . . . . *By R. G. Lister* 215
John Andrews. Australia's Resources and their Utilisation. Parts 1 and 2 . 216

New Zealand Geographer

VOLUME VI October, 1950 NUMBER 2

METROPOLITAN AUCKLAND 1740-1945: THE HISTORICAL GEOGRAPHY OF A NEW ZEALAND CITY*

L. L. POWNALL

FROM A SMALL CLUSTER OF TENTS on the foreshore of the Waitemata Harbour in a hundred years Auckland has become a national metropolis.[1] The city is built on a narrow isthmus which separates the estuaries of the Waitemata and Manukau.[2] The surface of this isthmus is dominated by a number of small volcanic cones. Radiating from these extinct volcanoes are a series of discontinuous ridges separated from one another by gullies and small valleys[3] (*Fig.* 1).

These ridges of both volcanic and sedimentary rocks break the generally undulating surface configuration. The greater surface area of the isthmus is composed of Tertiary sedimentary rocks, except where they have been covered by post-Tertiary lava flows and volcanic cones in the northwestern, central and southeastern districts. The older rocks also form the range of hills at the western end of the isthmus and the ridge and valley system of the northwestern shore of the Waitemata. But over most of the isthmus volcanic activity has created the distinctive surface forms of crater, cone, and ridge, of broad lava flow and small caldera. Of these landforms the most conspicuous is the volcanic island of Rangitoto protecting the entrance to the Waitemata and dominating the northeastern skyline.

1740-1839: The Tamaki Pa

In the early years of the eighteenth century, the isthmus on which Auckland now stands was known under the general name of Tamaki.

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*This is the first of two articles on the urban geography of Auckland. The present paper reviews the functions and form of the city at selected periods in the past. The second article, to be published in a later issue of the *New Zealand Geographer,* describes the character of the contemporary urban area. The research was made possible by a grant from the University of New Zealand Research Grants Committee to whom grateful acknowledgment is made.

[1] See Photogeography, *Fig.* 7, p. 195.

[2] The east-west distance between the Whau and Tamaki Rivers is twelve miles; at its widest the isthmus is approximately six and three-quarter miles narrowing in the southeast to three-quarters of a mile.

[3] For maps of the geological structure of the isthmus see P. C. N. Wong: *Some Aspects of the Post-Tertiary Volcanic Phenomena at Auckland,* unpublished thesis presented for the M.Sc. Degree in the University of New Zealand, 1946.

The isthmus at this period was inhabited by the Ngaiwi or Waiohua people. About 1740 the isthmus was thickly settled by these agriculturalists, some 10,000 Maori living between the Tamaki River and the Whau Creek[4] (*Fig.* 2). Its importance was due, in large measure, to the productivity of the area—the proximity of two large expanses of water, and the fertility of the soil; it was also the result of the natural advantages of the isthmus as a bridgeway between Northland and the rest of New Zealand. The Tamaki isthmus connected the two most densely settled regions of Maori population at that time.[5] Most travellers of the day either walked across the isthmus or dragged their canoes across it at the Otahuhu or Whau portages.[6] The isthmus was the nodal point of Maori routeways in the North Island; this was its prime function. Settlement, agriculture, and food gathering in the region were as much an expression of this nodality as they were of the inherent fertility of the isthmus.

The Maori lived in villages near and on the slopes of the volcanic cones which they terraced and used as forts in time of war.[7] Wherever the land was suitable, and especially about what is now Epsom, Remuera and the present Auckland Domain, the kumara was cultivated.[8] Bracken fern, manuka and other indigenous plants covered the surrounding area.[9]

From the middle of the eighteenth century, tribal warfare considerably reduced the number of Maori living on the Tamaki isthmus. By 1826, it is recorded, nobody was living on the isthmus although some land was kept in cultivation.[10] In 1837 a new pa was built at Orakei (Okahu), and it is known that a year later other permanent settlements existed at Onehunga, Mangere and 'Auckland'. The Orakei people in 1839 were cultivating 'Officials Bay' and had planted peach trees in the vicinity of Point Britomart.[11]

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[4] Sir Percy Smith in 'The Peopling of the North', *Journ. Polynesian Soc.*, Supplement to Vol. 6, 1897, p. 77, estimates that the average population of each pa at this time was at least 500 people. This gives a total figure considerably less than the estimate by F. von Hochstetter in *New Zealand*, Stuttgart, 1867, pp. 243-245, of 20,000 to 30,000. Although Smith believed that the Maungawhau pa in its day could hold 3000 people alone, F. D. Fenton in 'The Orakei Judgement', *Important Judgements Delivered in the Compensation Court and Native Land Court, 1866-1879*, Auckland, 1879, p. 64, doubted if this pa was occupied at this period.

[5] K. B. Cumberland: 'Aotearoa Maori: New Zealand about 1780', *Geogr. Rev.*, Vol. 39, No. 3, 1949, pp. 401-424.

[6] The Otahuhu portage was the more frequently used. See Cumberland: *op. cit.*, p. 411.

[7] Hochstetter: *op. cit.*, pp. 243-245, reconstructs a picture of these fortifications.

[8] Smith: *op. cit.*, p. 77.

[9] Hochstetter: *op. cit.*, p. 245.

[10] Fenton: *op. cit.*, p. 72.

[11] *ibid.*, p. 79. The reference to 'Auckland' most probably refers to Horotiu Bay, later Commercial Bay.

Credit for the first exploration of the Waitemata is given generally to the Rev. Samuel Marsden who visited the estuary between June and November 1820.[12] It is possible that pakeha Maori had visited the Tamaki isthmus before this date, but claims on their behalf have not been substantiated. At Onehunga Marsden and his party were the first Europeans to be seen in that area.[13]

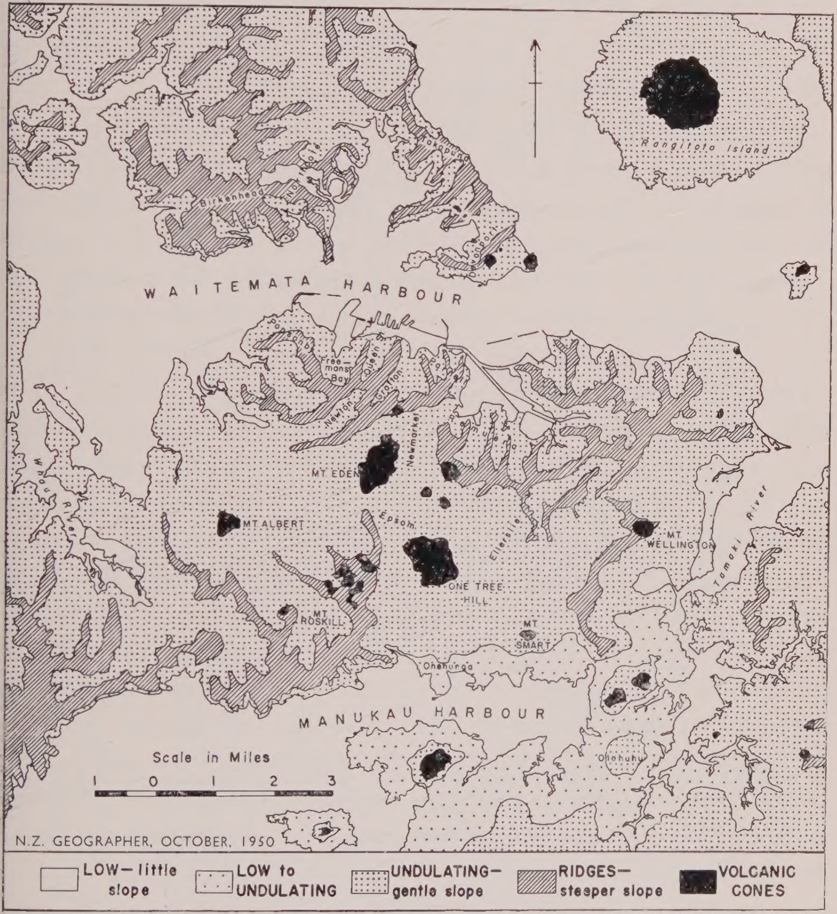

Fig. 1. Surface Configuration of Metropolitan Auckland.

Dumont D'Urville, on his second voyage to New Zealand, mapped the isthmus and its adjacent harbours in great detail.[14] No records of permanent Maori habitations were kept by either Marsden or D'Urville although both had frequent contact with the Maori who, it is known from other sources, must have been permanently domiciled on and near the isthmus at this period. By the late 1830's, the isthmus had been explored, its harbours charted, its topography described, and some settlement made by one or two Europeans in the surrounding region.[15]

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[12] J. R. Elder: *Letters and Journals of Samuel Marsden*, Dunedin, 1932, pp. 270–271, 314–315.

[13] *ibid.*, p. 315, footnote.

[14] Dumont D'Urville: *Atlas Historique*, Première Partie, 1827, in *Voyage de l'Astrolabe, 1826–1827*, Paris, 1830.

1840-1880: Pakeha Village and Town

In 1840 Captain William Hobson selected the northern coast of the Tamaki isthmus as the site for the future capital of New Zealand which he proposed to transfer from the Bay of Islands. Before choosing the general locality, Hobson consulted various authorities who were familiar with the area.[16] Hobson was responsible for selecting the actual site on the small bay of Horotiu, making his final selection only after careful, personal examination.[17] Hobson, himself, gives his reasons for selecting the isthmus as his future capital. Briefly these were: firstly, the central location; secondly, ease of water communications; thirdly, the harbour and proximity to small timber ports; and fourthly, the agricultural potential of the soil.[18] At Hobson's direction Felton Mathew laid out the first plan of the new capital. The area was formally occupied on 15 September 1840 and work was commenced on the initial task of settlement.[19]

The original plan of Auckland called for the construction of several crescents on the eastern side of the valley. Although only four of these were built, sufficient of Mathew's plan was carried out as to be recognisable in the present street pattern of the city proper. The capital itself was named by Captain Hobson in honour of Lord Auckland, the Governor-General of India who had taken an interest in the settlement of New Zealand.[20]

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[15] Rutherford in *The Founding of New Zealand: The Journals of Felton Mathew*, Dunedin, 1940, p. 63, states that a mission station was in existence at Maraetai on the Hauraki Gulf south of Auckland.

[16] Rutherford (*op. cit.*, pp. 57-58) suggests that Hobson was influenced in his selection of Auckland as the future capital by three groups: firstly, by the Rev. Henry Williams; secondly, by Captain Symonds of the Manukau Company; and thirdly, by Maori representatives from the Waitemata area who sought protection from the Ngapuhi and Waikato tribes. For details of Captain Symonds's interests see M. Hargreaves: *Early Manukau 1820-1865*, unpublished thesis presented for the M.A. Degree in the University of New Zealand, 1943, and for the opinions of the Rev. Williams, see H. Carleton: *The Life of Henry Williams*, Auckland, 1877, Vol. II, pp. 17-18.

[17] Rutherford (*op. cit.*, pp. 157-199) describes the details of selection and founding. The map of alternative sites considered (p. 159) should be noted.

[18] W. Hobson: 'Despatch to the Secretary for the Colonies, October 15th, 1840', *Parliamentary Papers Relating to New Zealand, 1840-1842*, London.

[19] *The New Zealand Advertiser and Bay of Islands Gazette*, 24 September 1840.

[20] The family name of Lord Auckland was given to Mount Eden and to Eden Crescent and Eden Street (later Parliament Street).

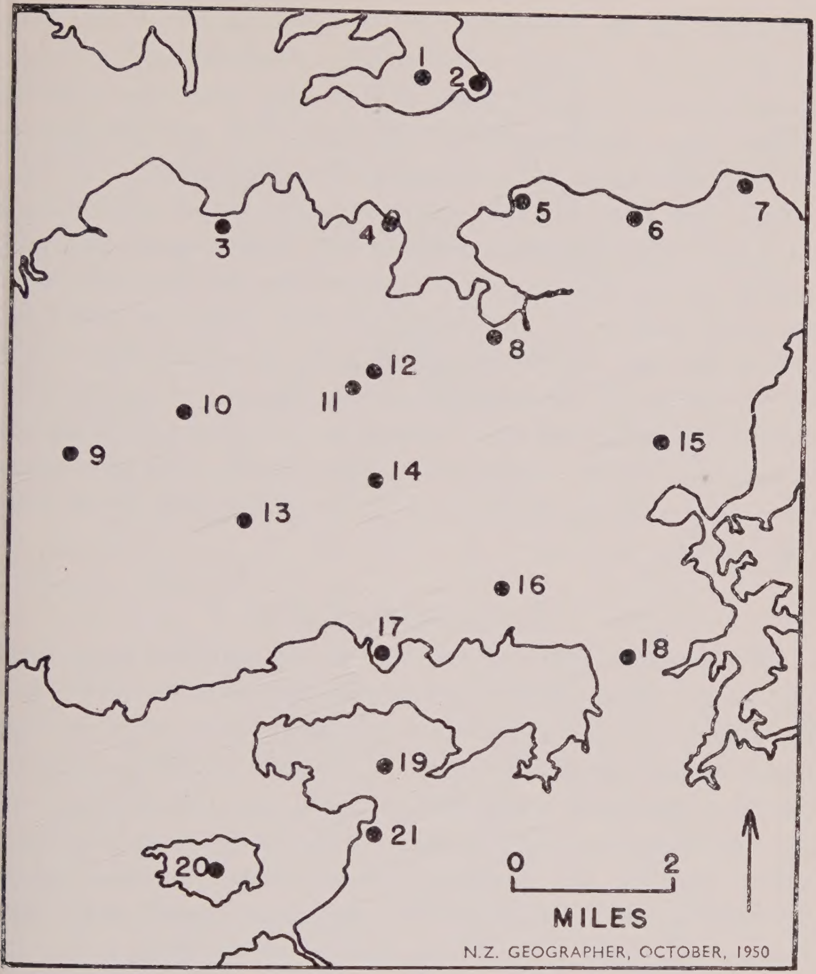

Fig. 2. Maori Pa in the Auckland District, 1740.

1, Takapuna; 2, Takarunga; 3, Te To; 4, Taurarua; 5, Tokapurewha; 6, Kohimarama; 7, Taurere; 8, Rangitoto; 9, Owairaka; 10, Puketapapa; 11, Tikopuke; 12, Remuera; 13, Te Tatua; 14, Maungakiekie; 15, Maungarei; 16, Raratonga; 17, Onehunga; 18, Otahuhu; 19, Mangere; 20, Puketutu; 21, Mokoia.

At the time it was first settled, the northern shore of the isthmus consisted of several small bays[21] separated by headlands (*Fig.* 3 inset). The first European settlement of Auckland was made along the shore of Commercial Bay (Horotiu). Here, on the south side of what today is Fort Street, the original nucleus of half a dozen tents and a wooden storage shed was located.[22] Three or four other tents were erected in Officials Bay, a similar number in Mechanics Bay, and two wooden huts were built alongside the flagstaff on Point Britomart.[23]

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[21] Of these, the most important were St. George's Bay, Mechanics Bay, Officials Bay, Commercial Bay, and Freemans Bay. All were to be reclaimed over a period of years and in some cases were to disappear as locality names, or the names were to be moved with the shoreline to new areas. 'Officials Bay' has disappeared as a locality name; Mechanics Bay is now approximately one-third of a mile from its original location; 'Commercial Bay' is no longer used as a term of reference; and only the name of Freemans Bay applies to the original area. Separating these bays were Point Britomart and Point Stanley or Smales Point. On the crest of Point Britomart, which was originally a spur extending from Princes Street to a headland above Kings Drive, the fort of the same name was erected.

Two years later, in 1842, some thirty-nine houses of wood and scoria had been occupied in Officials Bay, approximately the same number had been constructed in Mechanics Bay, the Anglican Church was a landmark on the southern part of Point Britomart, and Commercial Bay was ringed with buildings on its eastern shore.[24] The narrow valley with the small, meandering Ligar Creek leading down to Commercial Bay and now occupied by Queen Street had less than forty houses. On the eastern side of Point Stanley some sixty houses were scattered along the spur and up the gentle slopes of the ridge (*Fig.* 3, inset).

THE COMMERCIAL CENTRE

The commercial centre of Auckland in 1842 extended along Shortland Street.[25] From the initial period of settlement this street had been favoured of necessity in preference to Queen Street where the Ligar Creek banked up at high tides and swampy conditions generally prevailed. Shortland Street, Princes Street, and Officials Bay were the most important residential areas for the 'landed proprietors, merchants, bankers, and professional men'.[26] Of these three streets, Shortland Street also contained the residences of most of the shopkeepers who lived generally on their premises. Only a few had premises in Queen Street.

In the streets adjacent to Queen Street, in O'Connell, High, Chancery and Albert Streets, were the greatest numbers of 'mechanics and artisans'. Many tradesmen also resided in Mechanics Bay, and numerous agricultural workers lived in the town. But no single area was occupied exclusively by one section of the community; indeed, a characteristic of Auckland in 1842 was that the houses of artisans, shopkeepers and the wealthier townspeople were indiscriminately mixed in most parts of the town.

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[22] See Photogeography, *Fig.* 7, p. 195.
[23] See Photogeography, *Fig.* 2, p. 193.
[24] Census Book, Police Office, Auckland, 1842-1846; MSS. in Auckland City Central Library.
[25] See Photogeography, *Fig.* 8, p. 195.
[26] Census Book (*op. cit.*).

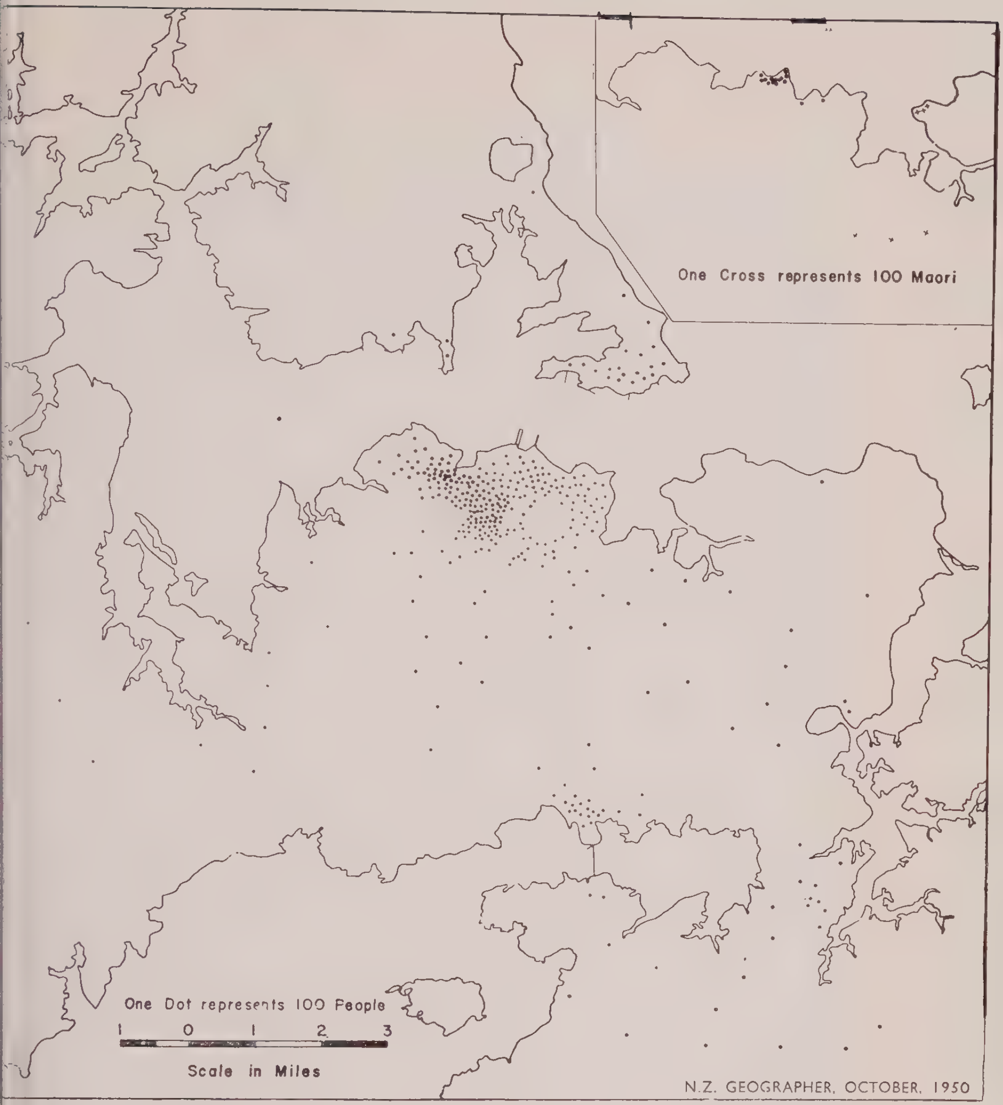
One Cross represents 100 Maori
One Dot represents 100 People
1 0 1 2 3
Scale in Miles
N.Z. GEOGRAPHER, OCTOBER, 1950

Fig. 3. Distribution of Population, 1881. (Inset, 1842).

Already several of the narrow thoroughfares had been laid out. The original subdivision of the lower part of the Ligar valley provided for the main roads only[27] to be constructed one chain or more in width. As a result, many of the side streets[28] were constructed for the owners of adjoining property who provided only the minimum amount of land for roading purposes.

By 1852 houses had spread along both ridges behind Point Britomart and Point Stanley. The church on Princes Street and the windmill north of Karangahape Road were prominent features on the urban skyline.[29] In this year the town did not extend beyond Wakefield Street, except for the Wesleyan College[30] and the windmill. Even within these limits not all of the land was occupied,[31] particularly on the eastern side of the valley in the vicinity of the Albert Barracks.[32] By comparison Point Britomart was crowded with buildings. Relatively few residences were scattered in the gully behind Mechanics Bay. In Commercial Bay a narrow wharf carried the trade of this port which already exceeded the combined trade of all the other ports of New Zealand.[33] The bay was the warehouse, shopping and commercial centre for Auckland, while Mechanics and Freemans Bays were the industrial areas.[34]

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[27] For example, Queen, Albert, Princes and Victoria Streets.

[28] In particular Vulcan Lane, O'Connell, High, Chancery, Swanson and Durham Streets.

Within the town only three streets had been graded, metalled and drained.[35] The commercial area comprised some eight or nine buildings on its western side—warehouses, offices, the courthouse, police office and gaol. The small shopping area still extended along the waterfront and Shortland Crescent.[36] At this period Queen Street served as the major outlet from the commercial area and waterfront, a function for which it was well suited because of its relatively slight gradient.

Most of the houses were built of wood and only a small number of brick.[37] Government buildings and residences were often made of scoria, a luxury ill-afforded by most owners because of the quantity and expense of the lime required in the use of this stone.[38]

Beyond the ridge which encircled the growing port and town, suburban residences and farms 'extended across the isthmus for the greater part of a mile'. The village of Onehunga spread north almost an equal distance, and Newmarket was almost joined to Auckland by suburban houses. Along the road connecting Newmarket and Onehunga the route was 'studded here and there by wayside houses'.[39] The other main roadways extended from the village of Newmarket along the Remuera ridge to the farmlands at Tamaki and along the south road to the soldier settlements at Howick and Drury. At this stage in the evolution of Auckland there is little evidence to suggest any regular pattern of urban growth.

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[29] See Photogeography, *Fig.* 3, p. 193.

[30] Today the Salvation Army's People's Palace (Private Hotel).

[31] William Swainson: *Auckland, the Capital of New Zealand and the Country Adjacent,* London, 1853, p. 32.

[32] Today Albert Park.

[33] A. Martin: *Journal of an Emigrant from Dorsetshire to New Zealand,* 1852, p. 49; typescript in Auckland City Central Library.

[34] According to Swainson: (*op. cit.,* p. 28) Mechanics Bay comprised 'a large rope-walk, a ship-builders' yard, a native hostelry, and a few small shops' in the former area. Only the ship-builders' yard has been removed from this area. Freemans Bay was occupied 'chiefly by saw-pits, brick-kilns, and boat-builders' yards'.

[35] These were Shortland Street linking Commercial and Officials Bays, Princes Street between the Fort and the Barracks, and Queen Street joining Commercial Bay and the cemetery. (Martin: *op. cit.,* p. 74.)

[36] See Photogeography, *Fig.* 9, p. 196.

[37] John Vercoe: (Plan of) *City of Auckland, New Zealand, 1866,* scale 2 chains to 1 inch, showing buildings and constructional materials used within a radius of half a mile of the wharf; Auckland City Central Library.

[38] Martin, *op. cit.,* p. 55.

Between 1840 and 1852, the population of Auckland had grown from two score or fewer residents to over 6000. The town centred around the port; this was the prime source of livelihood, directly or indirectly, for the majority of the urban dwellers. Auckland provided commercial and transport services linking the timber-miller, flax-gatherer, gold-miner and agriculturalist with the foreign industrialist and entrepreneur. With its shipping and warehouse facilities, its shops, offices, banks and factories, and its professional rooms, schools, churches and theatres, Auckland depended primarily for its existence upon the whole of the northern half of the island. The growth of the town reflected the development of its tributary region.[40]

1881–1921: The City Grows Up

In 1881 Auckland had spread beyond the limits of the Queen Street valley and encroached on to the farmlands of the isthmus (*Fig*. 3). On the northern shore of the Waitemata, however, the growth of population had been slow.[41] The highest population densities on the isthmus were on the upper slopes of Freemans Bay, in Grafton Gully and in the adjacent areas of Ponsonby and Newton Gully.[42] In the Ligar valley, Mechanics Bay and Parnell the concentration of residences was not as intensive. These areas together formed a belt of urban residences of an uneven width around the commercial core of the city. Elsewhere across the isthmus, the population was thinly scattered and predominantly rural in character. At Otahuhu and Onehunga the nuclei of towns had formed; already the western part of Onehunga was as intensively occupied as any residential area in

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[9] Swainson, *op. cit.*, p. 37.

[0] J. I. Horsman in *The Growth and Distribution of Population in the Auckland Province*, unpublished thesis presented for the M.A. Degree in the University of New Zealand, 1948, discusses this theory in a general way.

[1] Of the 27,483 residents in the Auckland area in this year, only 3240 were living on the North Shore, many of them in rural areas (*Census of New Zealand, 1881: Population of Ridings and Highway Districts*, Wellington, 1882). As late as 1854 there was no regular means of transport between the two shores of the Waitemata. It was not until the 1860's that steam ferries, in place of open boats, even slightly stimulated the suburban development of the North Shore.

[2] T. W. Hickson: *Map of the City of Auckland, New Zealand, 1882*, scale 2 chains to 1 inch; Auckland City Central Library.

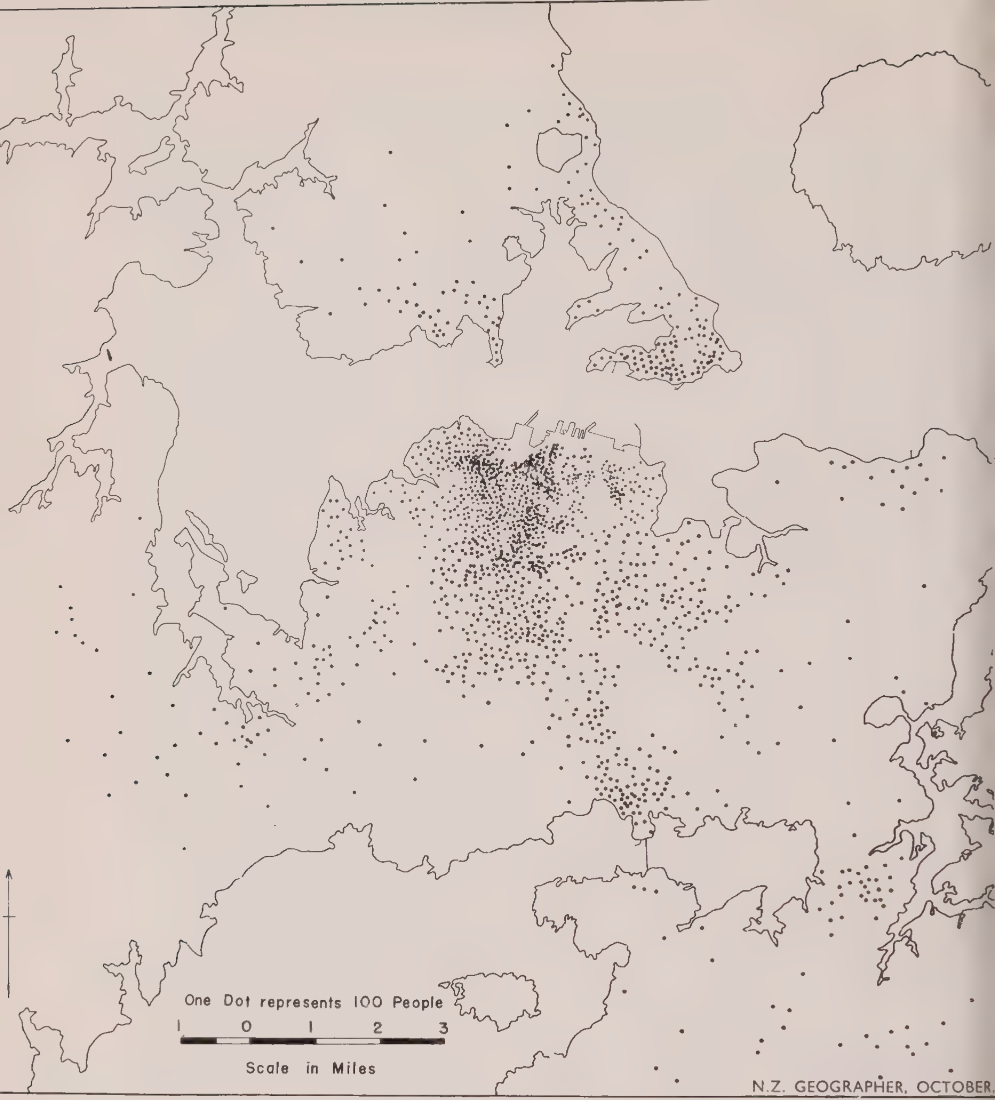

Fig. 4. Distribution of Population, 1921.

the city (*Fig.* 3). Within the 'inner' belt of residences, the reserved open spaces of the cemeteries and the Domain were surrounded by houses. The early concentration of population along the northern slopes of the Ponsonby-Karangahape ridge, and later in the neighbouring gullies of Newton and Grafton, was conditioned more by the inadequacy of transport than by any other factor.

The reclamation of the Waitemata had changed the coastline considerably.[43] Mechanics and Freemans Bays were the most important heavy industrial areas in Auckland. From as early as 1851, and possibly even before that date, the mixing of residences had been taking place

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[43] J. Barr: *The Ports of Auckland*, Auckland, 1926, pp. 150–151.

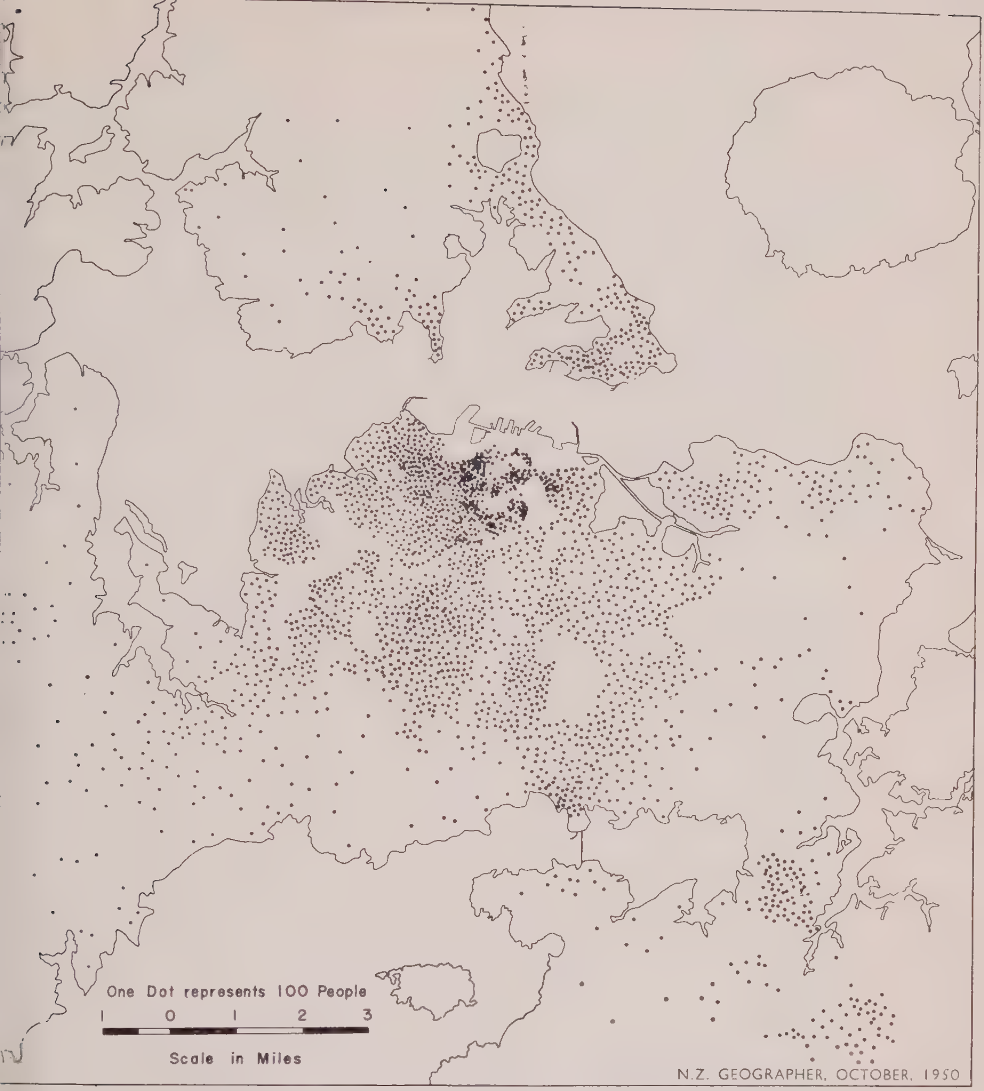

Fig. 5. Distribution of Population, 1945.

along the foreshore of Freemans Bay. Residential blight was not unknown in that area in 1881.[44]

The expansion of the urban area and the channeling of the Ligar Creek made Queen Street the main roadway between the port and shops and the residential areas. As a consequence of this fact and because of the greater area for the expansion of retail shops than in Shortland Street, the road along the valley floor had become the major commercial area of Auckland by 1881.[45] North of Wakefield

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[44] The increased use of electric power has considerably reduced some of the undesirable features associated with urban industrialisation.

[45] It is improbable that the relative steepness of Shortland Street was as important as the aforementioned factors in bringing about the above change.

Street—the limit of urban settlement only thirty years before—Queen Street was completely occupied by shops, offices and an occasional factory. But in 1881, Queen Street was not wholly commercial in character (*Fig.* 7).

In the past many of the largest residences had been located on the ridge to the east of the Ligar valley. In this period they were built along the upper slopes of the ridges and spurs further to the east and in parts of Mount Eden. As a result there was a gradual change in the functions of the area close to Queen Street from single to multiple units, from private homes to boarding houses[46] (*Fig.* 6).

Expansion Southwards

In the forty years between 1881 and 1921, the population of Auckland and its suburbs grew from 27,483 to 157,757. With its increased population and efficient electric tramway, the residential area in 1921 extended in a wide belt across the isthmus to Onehunga (*Fig.* 4). At the same time there had been an increased concentration of people within the residential areas of early settlement and high density. This was accompanied by a marked growth of Remuera, Epsom, Ellerslie (along the Great South Road), the northeastern bays of the isthmus, the western marginal areas, and the North Shore, particularly Devonport and Birkenhead. (Compare *Figs.* 3 and 4.) The high population density of western Onehunga was unchanged. Since 1881 there had been also a slight withdrawal of residences from the northern fringe of Freemans Bay as industrial development had intensified and expanded.[47] With its large, grimy factories, tall smokestacks, deteriorating and decayed houses, and jumble of closely-packed buildings, Freemans Bay presented a drab landscape more generally associated with industrialisation overseas than in New Zealand.

Equally significant in the evolution of Auckland was the extension of the foreshore on the eastern side of the Ligar valley. On this land the railway station had been built in the late 1880's. In order to provide space for the marshalling yards and access to the station, Point Britomart had been removed and Officials Bay had disappeared.[48] The port facilities had also been expanded, both in the size and number of

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[46] The causes of this centripetal movement were both social and technological: the aggregation of capital and large families, and the improved condition of the transport services.

[47] The bay had been completely reclaimed by 1921 and the contiguous area of Western Reclamation to the north had been consolidated.

[48] See Photogeography, *Fig.* 4, p. 193.

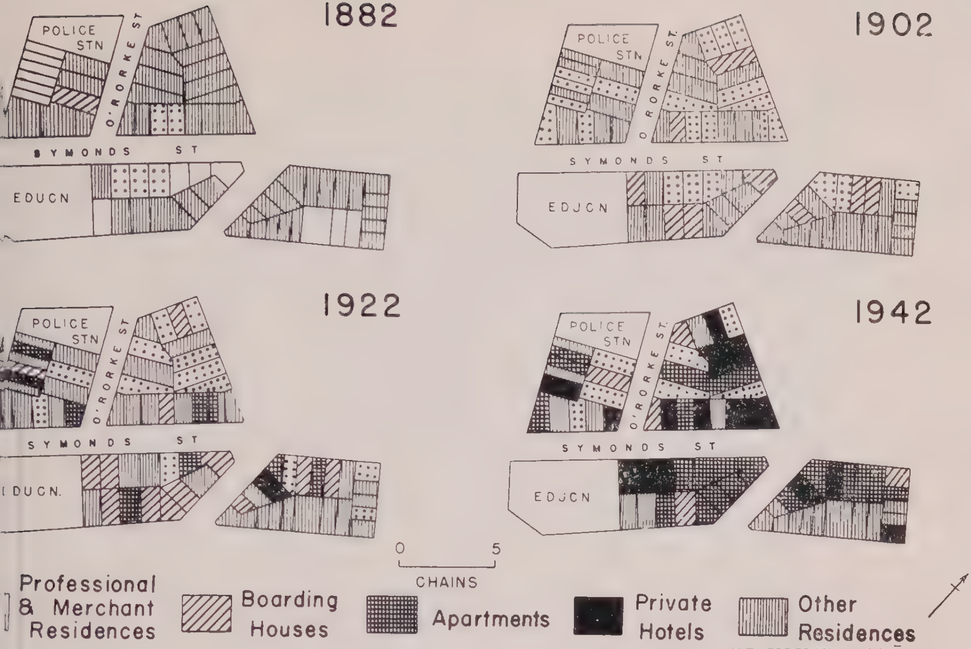

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Fig. 6. Functional Changes in the Symonds Street Area, 1882–1942.

wharves and the extent of the associated buildings and equipment. Although the whole appearance of the port had changed, the pre-eminent position of the port in the functional structure of Auckland still remained.

1922–1945: National Metropolis

Changes in the appearance of the urban landscape of Auckland between 1922 and 1945 were less spectacular than those of the previous forty years. The central area of the city showed little structural modification, particularly in the retail area where few new buildings had been erected. The most significant developments were the changes in the urban pattern and the rise of the city to the status of national metropolis. The growth of population in this period merely intensified the settlement patterns noted in the earlier periods (*Fig.* 5).

An addition to the changes in the residential pattern of Auckland was the growth of industries and industrial areas, particularly on the southeastern perimeter and in the central core.[49] The expansion of industry is related closely to the imposition of import controls in 1938 and the initiation of a policy of economic nationalism by the government. The trend towards industrialisation was further stimulated by the outbreak of the war in 1939; it has been maintained by the postwar demand for manufactured products and the continued restriction of imports. As the major overseas port and largest city in New Zealand, Auckland had initial advantages over rival cities in the programme of industrial expansion. The availability of level sites for the erection of warehouses and factories adjacent to the waterfront or existing rail transport was also an additional advantage for certain classes of industry. Adequate port facilities, the potentially large supply of labour, and the location of Auckland as regional centre for nearly forty percent of the total population of New Zealand were contributing factors. The outstanding feature of this period, however, is the emergence of Auckland as a national metropolis.

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[49] It should be noted that the movement of industries out of the central area has not been, as yet, a factor of major importance in the evolution of the urban landscape of Auckland.

TABLE I

INDEX OF POPULATION OF LARGEST URBAN AREAS: 1874-1945*

(Base: Auckland, 1901 equals 100)

Year	Auckland	Wellington	Christchurch	Dunedin
1874[1] - - -	42	20	34	34
1901[2] - - -	100	73	85	72
1911 - - -	153	105	119	96
1921 - - -	235	160	157	107
1926 - - -	288	181	176	127
1936 - - -	315	222	197	122
1945 - - -	392	256	222	124

*'Urban areas' listed here are defined by the Census and Statistics Department; the boundaries of such areas are not necessarily coincident with the Metropolitan areas defined by local authorities.

[1] Estimated from 'Census for 1874'.

[2] Statistics for urban areas have been published since 1921, and calculated for 1901 and 1911 by the Census and Statistics Department. Totals exclude Maori.

In 1874 the population of Auckland exceeded that of Christchurch and Dunedin by only four thousand approximately (Table I). The introduction of refrigeration and the consequent expansion of dairy farming in the Waikato early in the 1900's resulted in the rapid growth of this metropolitan area by comparison with the other three largest cities. As early as 1901 the urban area of Auckland had ten thousand more people than the next largest city, Christchurch. After 1918 successful land settlement schemes in South Auckland and the King Country further increased the relative importance of this port. The rapid, upward trend in population was maintained by the expansion of urban industry in the 'twenties and 'thirties together with an ntensification of dairying in the Auckland Province. By 1945, the population of metropolitan Auckland equalled the combined population of Wellington and Dunedin. In this year, almost twenty-five percent of the urban population of New Zealand was living in this city.

Many problems have resulted from the increase in population and the rise of Auckland to the position of national metropolis. Of these none are more pressing than the problems associated with the multiplicity of local authorities: sewage disposal, residential blight and transport movements. In no area is the complex of problems greater than in the central core, the area of initial European settlement.

TABLE II

The Number of Functional Units in Queen Street: 1878–1942

	1878	1882	1902	1922	1942	
Northeast Queen Street	101	122	205	496	468	1029
Northwest Queen Street (Quay Street-Wellesley Street)	158	156	314	452	561	
Southeast Queen Street	59	50	62	93	123	233
Southwest Queen Street (Wellesley Street-Karangahape Road)	30	32	32	46	110	

Evolution of the Central Retail Area

In the development of the central retail area, three major features may e recognised. Firstly, the early expansion of the commercial core; econdly, the increase in building density; and thirdly, the change in unctions within the area. From the nucleus around Shortland and Fort treets, the commercial area expanded over the whole of the valley. here had been, in addition to this lateral expansion, an increase in the otal area and total number of business premises as a result of vertical uilding. (See Table II.) This has been particularly marked in the dest part of the commercial core and on the level, reclaimed land. In ueen Street itself major functions have varied from period to period. Until the middle of the last century Queen Street was predominantly sidential in character. In 1878 shops and residences were of approximately equal number. By 1942, however, Queen Street was made o predominantly of shops and offices, while residences were few in number (*Fig.* 7). Functions also varied in Queen Street from area to area; for example, until the early 1900's, Upper Queen Street was residential in character while the adjoining blocks were essentially shopping areas. In no single area of Queen Street has the functional structure remained static, for in addition to the changes already noted (*Fig.* 7) the types of retail and commercial business have also altered.[50]

Many of these developments were the result of the growth of the city. The early expansion of the shopping area was associated with the fact that most of the business men established themselves at first in small premises. As the commerce of the town developed, new sites were occupied instead of new buildings being constructed on the original plots. But with the increasing competition for premises in the centre of the business area it became economic to construct higher buildings. The functional structure of Queen Street also changed as a result of the competition for sites. Residences were the first buildings to be replaced as is shown by the early shifting of boarding houses from Lower Queen Street to the upper end. Industry, the next most vulnerable function, moved either to higher floors or to new areas, generally within the central area.

Evolution of Metropolitan Auckland

The rapid growth of the city resulted in the haphazard expansion of the urban area in the manner already noted, producing an uneven settlement pattern. This was due to the subdivision of farm lands in different areas at different periods. 'Dormitory' towns to the south were originally small farming centres. The establishment of large industrial units[51] on the southeastern fringe of the urban area contributed to the growth of these towns while the expansion of Auckland changed their function to 'dormitory' towns. The growth of Auckland is paralleled by the development of its tributary economic region for the prosperity of the town depended upon the productivity of the country. (See Table III.)

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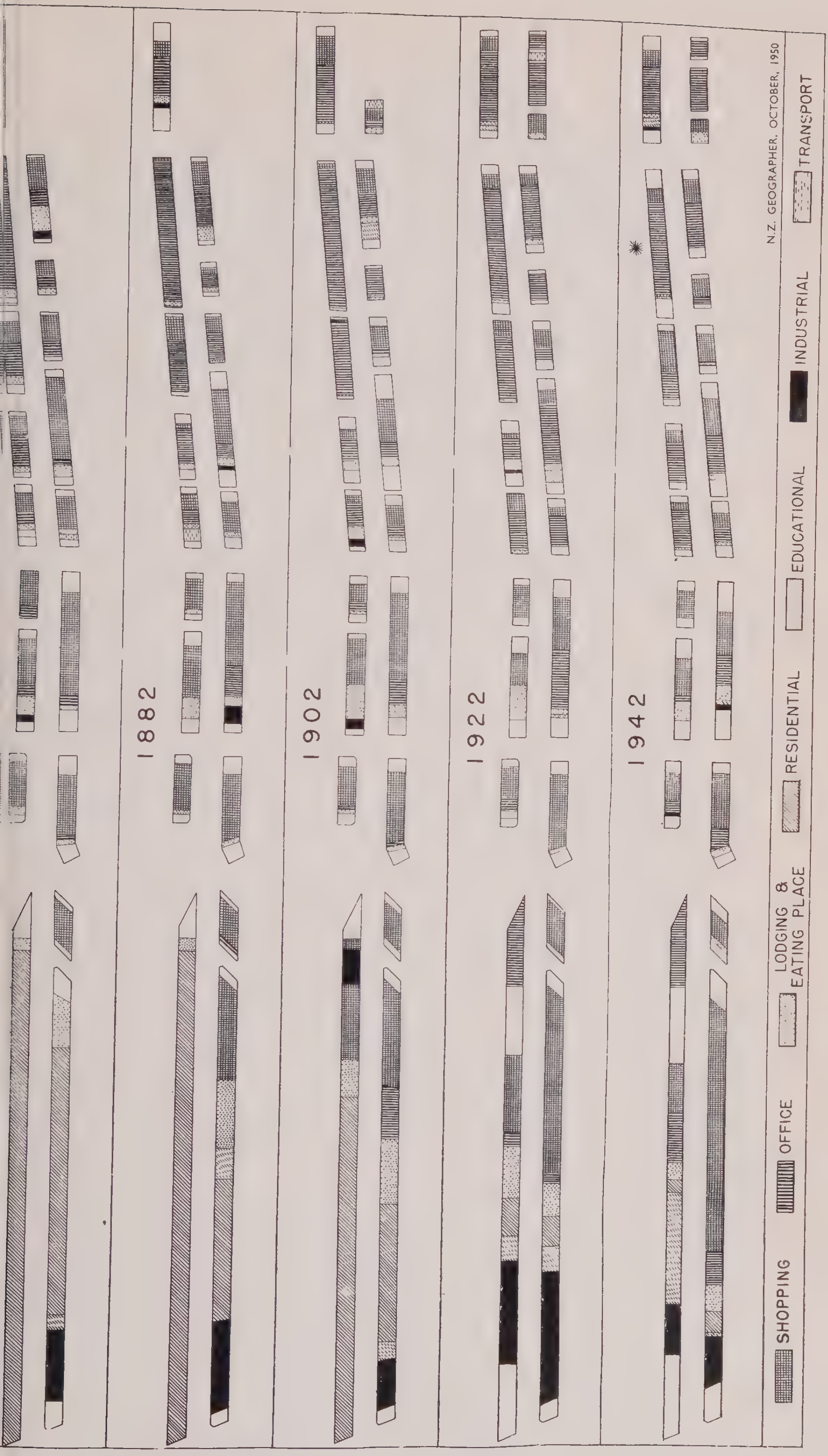
[50] For example, the relative importance of provision shops in Queen Street declined, and boarding houses and restaurants were replaced by milk bars, quick-lunch counters and cafes.

[51] Freezing works, fertiliser works and railway workshops among others.

Fig. 7. (opposite). Functional Units in Queen Street, 1878-1942.

In the block marked with an asterisk, the subdivisions of the major functions are not shown because of difficulties in reproduction. On the original diagram nine functional divisions were delimited: eating-places; provision, apparel and service shops; and professional, financial, insurance, general and agency offices.



N.Z. GEOGRAPHER, OCTOBER, 1950

That Auckland grew to dominate this part of New Zealand was to be expected.

Auckland benefited initially by its early start, for at the time of its foundation in 1840, only 750 people were estimated to be living in the whole of the province. The city also profited from the fact that it was the national capital during its early years. The seat of government not only attracted officials but also provided employment for other workers. Auckland would have existed on this account alone. But it was more than a seat of government, and the transfer of the capital was not to have the same effect on Auckland as it had had on Russell. This was largely due to the nodal position of Auckland astride the bridgeway between Northland and the Waikato. The gold workings of the Coromandel Peninsula also permanently affected the development of transport and communications throughout the province in the 1860's and stimulated public works and the expansion of the port facilities of the Waitemata Harbour. With the boom in dairying, Auckland found itself the exporting and importing centre for the Waikato, the richest dairying region in New Zealand.

TABLE III

INDEX OF POPULATION, AUCKLAND URBAN AREA, AND PROVINCE: 1840–1945*

(Base: 1843 equals 100)

	1840	1843	1861	1881	1901	1921	1945
Urban Area	?	100	320	1097	2689	6,310	10,535
Province	22	100	713	2902	5134	10,785	18,704

*1840–1861 Horsman: *op.cit.* : 1881–1945 Census Returns.

Along with the growth of commercial activity went the development of industry to supply the needs of town and country. Not all increases in the overall population of this urban area, however, can be explained solely by reference to the development of the surrounding area, or to changes in political theories and agricultural and industrial technology. Social habits, particularly the national preference for urban life, must be noted in an analysis of the historical evolution of Auckland.

TE KUITI AND THE NORTHERN KING COUNTRY: A REGION OF AGRICULTURAL TRANSITION*

JAMES W. FOX

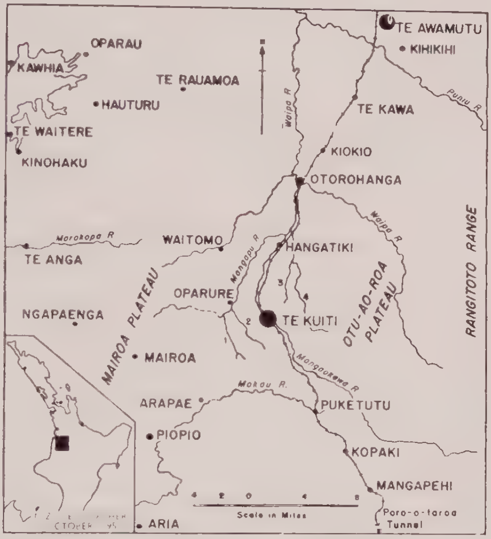


Fig. 1. Location Map. The streams draining the Te Kuiti region are: 1, Mangarama; 2, Mangatea; 3, Mangaorino; 4, Mangarapa.

SOUTHWARDS from Auckland over a distance of a hundred and thirty miles the main road and railway run practically side by side to Te Kuiti. There the road to New Plymouth diverges westwards to the coast and traverses another hundred miles of broken country to the lowlands of Taranaki, whilst the railway begins its climb into the higher plateaus and ranges in the interior of the North Island. The locomotive exhaust of the southbound express takes on a fuller, deeper note as the train mounts the gradients of a tortuous, steep track through a land of sombre ridges and valleys, the domain of brown-green fern and scrub, with patches of native bush which become more extensive towards the eastern horizon; a land of isolated farm settlements and recent straggling communities of miners and sawmillers. The Waikato and Waipa with their untidy peat swamps and rolling grasslands, their trim dairy farms and their towns and city have been left behind. For at the 'narrowing-in'[1] of Te Kuiti a frontier is reached.

There lies the boundary between lowland and hill country, between intensive dairy farming and more extensive pastoralisms, between a landscape culturally modified at a much earlier date and a land which has but recently felt the full impact of the pakeha. Eighty years ago few white men had passed this way, for the *aukati* still stood inviolate as the northern boundary of the King Country, and even forty years ago farming settlements were, at best, haphazard in their distribution and small in number. Pioneer clearings had merely fretted the edges of that vast tumbled area between the headwaters of the Waipa and the Wanganui which today remains sparsely peopled and unknown to many New Zealanders, for express trains cross it in the night and the highways are primarily of local significance.

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*This survey is part of a wider project covering the northern margin of the King Country and has been rendered possible by a grant from the University of New Zealand Research Grants Committee, to whom grateful acknowledgment is here made. Thanks are also due to those students of the Department of Geography, Auckland University College, who aided in the mapping of the land utilisation.

[1] Te Kuiti is an abbreviated form of Te Kuititanga, 'the narrowing-in'—a twofold reference to the constriction of the valley of the Mangaokewa at this point and to the hemming-in of the Maori between the hill country and the advancing frontier of pakeha settlement.

FRONTIERS OF SETTLEMENT

The landscape of the King Country has altered remarkably since 1870, especially during the years of this century, and no part bears greater witness to the change than the northern fringe between Te Awamutu and Te Kuiti (*Fig.* 1). Within a short span distinctive economics have each evolved and yielded as successive waves of exploitation have passed from north to south through the region. Flax gathering, timber milling and the search for minerals; pioneer subsistence farming; an extensive pastoralism; and finally an intensive dairying have all at certain periods characterised this northern margin. Nevertheless development has not always been continuous. Occasional setbacks, the result of misapplied knowledge or economic vicissitudes, have from time to time halted the forward surge of settlement and have left their mark. But today dairy farms begin to dot the edge of the hill country where once there were only sheep farms, whilst in the interior, logging in the native bush foreshadows the advance of settlement into the more remote ranges.

Consequently, in the patterns of land use which typify this northern margin of the King Country adjacent to Te Kuiti there are to be found not only the vestiges of former more spacious economies and of previous occupance, but also transitional features which provide the basis of a regional differentiation. The north may be distinguished from the south, and each from the west and east, but overall is evinced that transition from intensively-used farmland to undeveloped or reverting country which is epitomical of the northern King Country as a whole and which endows this borderland with its outstanding characteristics.

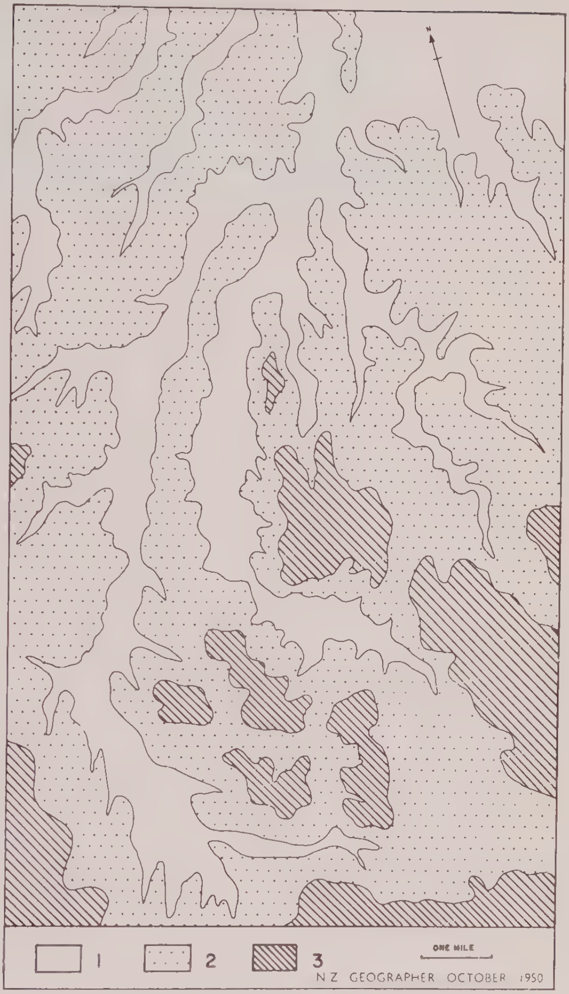

Fig. 2. Surface Configuration: 1, River flat; 2, Easy rolling country; 3, Steep hill slopes.

In contrast with the cultural complexity, the broad physical setting is comparatively simple. To the east of Te Kuiti, beneath the shadow of the Rangitoto Range, extend the fringes of the Volcanic Plateau with its pumice and ignimbrite. To the south lies the dissected country drained westwards by the Mokau and its tributaries. Northwards from the Mokau watershed the general elevation of the land falls rapidly along the lines of the streams flowing to the Waipa, whilst to the west the plateau landscape is again dominated by higher ridges which culminate in the Herangi Range. This surface configuration reflects to a major degree the structure and the geology. In the west and east the thinly-veneered greywackes of the Mairoa and Otu-ao-roa Plateaus rise to an average height of 1200 feet. Between is downfaulted a shallow syncline filled with Tertiary limestones, sandstones and mudstones which range in their upper levels from 600 to 1000 feet. Ignimbrite in many places crowns the higher ridges and hills of this central depression—relics of a sheet which formerly covered the whole area and which subsequently underwent extensive erosion.[2]

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[2] For a systematic interpretation of the geology see J. Marwick: 'Geology of the Te Kuiti Subdivision,' *N.Z. Geological Survey Bulletin No. 41*, Wellington, 1942.

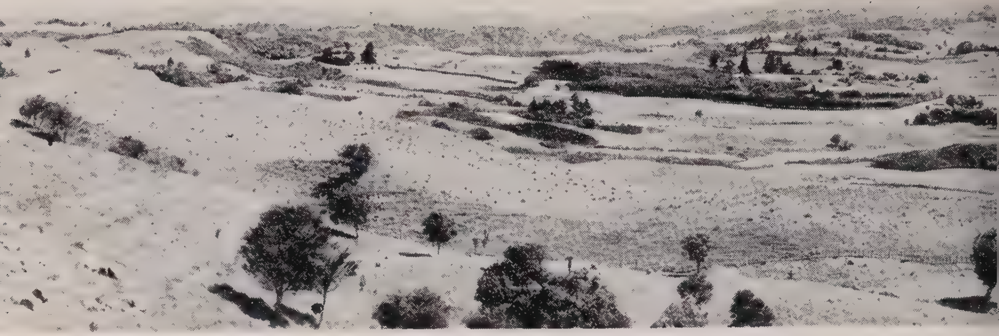


Fig. 3. The Central Depression Northwards from Te Kuiti. The limestone scarp to the west, the rolling mudstone country and the river flat provide the configurational elements in a pastoral landscape characterised by partial reversion. In the distance, Pirongia (to the west) and Kakepuku are symbolic of the volcanic activity which has contributed to the individuality of the region.

Within the central depression, which embraces the Te Kuiti region, the sandstones and mudstones, flanked by the limestone and drained by the many tributaries of the Waipa, constitute an area characterised by extensive river plains built up during an aggradational period when the streams were overloaded with pumiceous material (*Fig.* 2). Broad flats of river silts and water-sorted pumice border the Mangapu, the Mangaokewa, the Mangarapa and their affluents, and offer a marked break of slope where they abut on to the steeply-rising interfluves. So slight is the gradient of these flats that marsh naturally becomes typical and drainage presents great difficulties. Choking by willows in the middle and lower courses adds to the problem of insufficient fall and further restricts the flow. Reclamation has been possible along the courses of certain streams, the Mangaokewa in particular, by clearing and straightening, and as a result the water table has been lowered by as much as twelve feet. But such works are costly, and often cannot be universally applied along a river because of ownership and rating problems on Maori land. Consequently the pakeha farmer nurses a sense of grievance whilst much valuable land remains unused, or at best is being reclaimed but slowly.

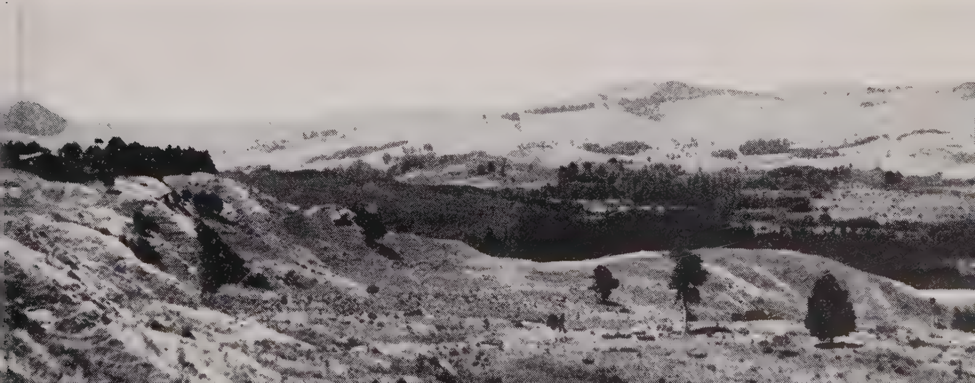
South and southwest of Te Kuiti the river bottom land is restricted, in the main, to the valley of the Mangarama. Drainage problems therefore do not bulk so large, although they are by no means absent. In this part of the northern King Country the nature of the country changes rapidly from near-flat or rolling to steeply-undulating, with the highest crests in the extreme south along the Mokau-Waipa watershed. This is 'papa' country where unstable mudstones and sandstones, overloaded with water, have slumped and produced characteristic scar-slopes with their hummocky bases (*Fig.* 4).

TRANSITIONAL ASPECTS

These, then, are the basic elements of the surface configuration in the Te Kuiti region—marshy river flats, rolling 'papa' country and fringing limestone hills, all heralding with their ash cover and ignimbrite the approaches to the Volcanic Plateau. Culturally the transitional character is emphasised by the change in farming between the lowland flats and the mudstone and limestone ridges, by the decrease in population as the higher country is approached, and by the greater expanse of reverting or unimproved land typical of the more inaccessible areas. The dairy farms of the northern plains give way to sheep farms as the hill country closes in to the south, fat-lamb production in turn yields to breeding as the limestone margins are reached, until finally to the west and southeast, bush begins to occupy a significant proportion of the landscape. So is completed the transition from the intensive dairying of the Waikato to the more spacious and more precarious economies associated with the North Island hill country.

In this transition, both in the past as the successive 'fringes' of development passed through the area and in the present pattern of land use, accessibility has always played a significant role. As the King Country was opened up by the pakeha the main lines of approach lay along the valleys from the north and southwest. Later, as roads

Fig. 4. Slumped Mudstone Country and the Bottom Land of the Mangarama.



were formed into the bordering hills, more settlers penetrated into the remoter areas, and to this day proximity to the road remains often a criterion of wellbeing and is a characteristic feature in the pattern of distribution of farmsteads within the region (*Fig.* 5). Fertiliser must be taken on to the land, stock must be taken off. Consequently it is the more distant farm that suffers in any economic recession, and the extent of poor and reverted land on the broken country south and west of Te Kuiti is evidence of the fate that overtook many farmers in the difficult times of the 'twenties and early 'thirties.

Rainfall and Reversion

Nevertheless, difficulty of access alone does not explain the problems with which King Country farmers have had to grapple. Heavy rainfall is typical of most of the area. On the lower lands of the central depression it amounts to sixty inches, occurring on 150 to 160 raindays, whilst on the bordering ranges as much as eighty to a hundred inches may be received on 110 to 150 raindays. Problems of soil erosion may arise—gullying on newly-disced land, particularly in backcountry areas, and sheet erosion on the unstable mudstones and sandstones, especially where there is a tendency to overstock or overgraze. In the limestone country, however, conditions are rather different. *Tomo* (sink holes) abound and there is a characteristic lack of surface water which, among other things, distinguishes this region from the rest of the central depression.

Moreover this general heavy rainfall promotes rapid leaching and a speedy reversion to manuka scrub if pastures are not maintained by constant topdressing, for the soils are not inherently fertile. On the higher land they are poor, derived mainly from ignimbrite and sandstone, with an admixture of volcanic ash; whilst on the valley flats the silts and pumice break down into a good soil if not waterlogged. Between is an intermediate category of soils developed on the mudstones and again distinguished by an ash cover in most localities.

Volcanic Ash and Soil Fertility

Volcanic ash, in fact, contributes much to the individuality of the northern King Country. The thickness of the beds varies, but is often more than twenty feet, and on the higher country the ash constitutes a soil-forming element notable for its lack of trace minerals, particularly cobalt. This deficiency, notorious on the Mairoa Plateau,

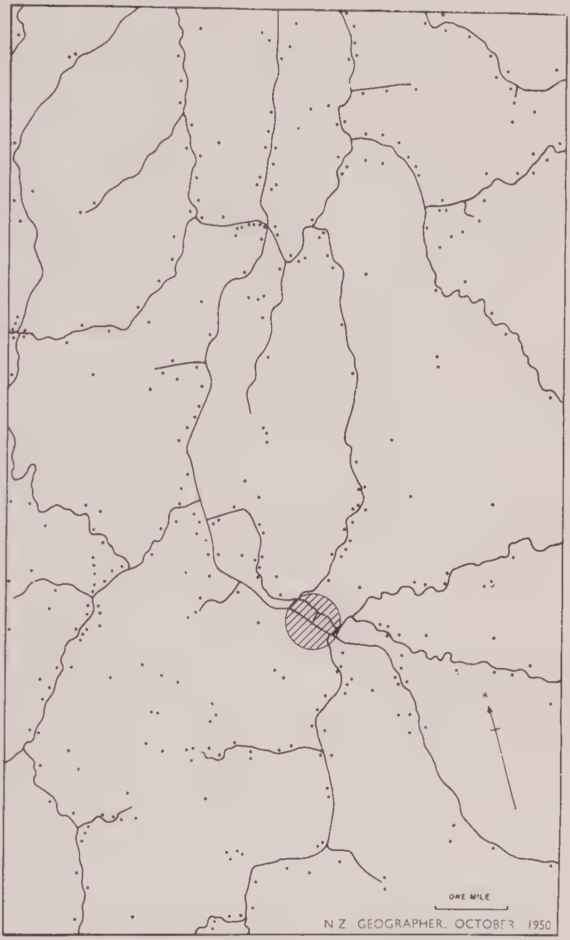


Fig. 5. Roads and Settlement.

coupled with the rapid leaching, rendered farming hazardous for many years, and sick stock and degenerating pastures broke the heart and the pocket of many a farmer. The wastage of sheep had always occurred, though never in numbers great enough to warrant comment under the conditions of pioneer farming typical of the period. But as the years progressed the loss grew to alarming proportions. Good grasses established after the bush-burn gave way to poorer varieties, and with the diminution in the numbers of sheep, ragwort invaded the pastures and severely reduced dairy production. Eventually the stage was reached when the cream cheque provided sufficient funds only to meet the domestic food bill.[3] So it was that in the early 'twenties the combination of poor land, falling prices and difficult access finally proved too much for even the most tenacious of the pioneers, and it was not until scientific investigation had shown the cause of this 'sickness' and furnished a remedy that the number of stock increased appreciably instead of dwindled.[4]

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[3] C. M. Wright and N. H. Taylor: 'A Successful Experiment on Sheep-sick Country in Mairoa District', *N.Z. Journ. Sci. and Tech.*, Vol. 13, No. 2, 1931, p. 59.

[4] For details of the investigations carried out see N. H. Taylor: 'The Relation of Geology to Sheep Sickness in Mairoa District', *N.Z. Journ. Sci. and Tech.*, Vol. 12, No. 1, 1930, pp. 1–10; *idem:* 'Soil Processes in Volcanic Ash Beds', *N.Z. Journ. Sci. and Tech.*, Vol. 14, No. 4, 1933, pp. 193–202; and L. I. Grange and N. H. Taylor: 'The Distribution and Field Characteristics of Bush-sick Soils' in *N.Z. Dept. Sci. and Ind. Res. Bull. No. 32*, 1932, pp. 21–35. Reference should also be made to Table I, p. 135.

The humus content of the soils in this northern margin of the King Country was never great, for the indigenous mixed rimu-tawa forest was comparatively young and broken by wide expanses of open fern and scrub. The earliest settlers took the bush-covered land whenever possible, assuming it to be the best; but even so, the soil did not hold the fertility produced by the subsequent burn for more than a few years. On the river flats the marsh vegetation and the kahikatea stands were left to exploitative industry until such time as drainage became necessary to improve the land for a more intensive type of farming. Thus it was the more accessible intermediate hill slopes that were acquired for farmland and settlement and which today provide ample evidence of fifty years of unremitting toil. The fern and scrub, the bottom lands and the more remote bush were brought in later as they became available or were utilised because there was nothing better.

The First Settlements

The earliest pakeha settlements in the King Country were those of the missionaries who penetrated into the valleys of the Waipa and Mokau. In the north, Morgan of Te Awamutu, an Anglican, moved back and forth across what was to become the frontier zone, bringing to the Maori the advantages of European crops and modes of farming. Between 1841 and 1865 this section of the Waipa valley enjoyed what Cowan has called 'the golden age' producing wheat, fruit, pasture grasses and subsistence crops in comparative abundance, and despatching flour to the Auckland market.[5] In the west the Wesleyans built their station at Te Waitere on Kawhia Harbour in 1834 and thence penetrated across the Te Rauamoa Range to Te Kopua near Otorohanga and up the valley of the Mangapu to Whakatumutumu near Arapae on the Mokau. By 1843 Wesleyans were also established on the lower Mokau at Mahoe, whilst in the Aria district Roman Catholics and Lutherans were active. There may have been other European influence too, particularly that of runaway sailors who became pakeha Maori, as Donald McLean noted in 1845.[6] The good that these Europeans did, and the benefits of the civilisation they brought, disappeared in the bitter struggles of the Maori wars, so that when pioneer farmers arrived at the turn of the century nothing remained but a few rotting mill timbers and tumbled sod walls, crops and animals gone wild, exotic grasses and a few graves.

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[5] J. Cowan: *The Old Frontier*, Te Awamutu, 1922, p. 18.

[6] 'There is a European emigrant living near, who found his way there with some traders from New Plymouth. . . . The natives are quickly imitating his mode of agriculture and benefiting by the various kinds of seeds he introduces. . . .' (Quoted in the *King Country Chronicle*, 27 January 1950.) The man was a carpenter by trade and lived in the pa across the Mokau from the Wesleyan mission.

The Pioneer Period

Meanwhile Te Kuiti itself had passed through its railway epoch. When the *aukati* was lifted in 1885 the railway was pushed rapidly on to Otorohanga and Te Kuiti, which were both reached in 1887. In 1898 the line was completed as far as the Poro-o-tarao tunnel and Te Kuiti ceased to function as a railhead. But by this time Maori hegemony in the northern King Country was at an end and the first settlers had begun to take up land. Although as late as 1892 'not an acre of King Country land had passed into the white farmers' hands . . . [and] not a pakeha homestead redeemed the wastes of fern and manuka southward of the Puniu River',[7] by 1898 the first pioneers were clearing their land and broadcasting their grass seed in Mairoa, Màhoenui and Paemako. In the early 1900's the Piopio, Aria, Troopers Road and Rangitoto areas saw the influx of young men, many from the South Island, ready to break in virgin land and wrest a living from the soil despite the lack of roads and amenities.

The prosperity of the Te Kuiti borderland dates from this period when, in 1908 and 1909, the settlement of the Rangitoto block to the east marked the final advance into the remoter hill country and when legislation provided for unrestricted alienation of Maori land by the Crown and for taking up Maori land on lease. The railway between Auckland and Wellington was now complete. The demand for refrigerated produce was rising steadily. By 1914 practically all the available farmland round Te Kuiti was occupied—either bought freehold or leased from the Maori or the Crown—and increasing numbers of cattle and sheep were pastured on the newly-established grasses among the fallen logs.

War and Its Aftermath

War came in 1914 and took from the King Country many of its best men. Depression followed, land values fell, and the smaller returns on farms which perforce had not been as well managed during the war years meant that mortgage commitments could not be met. Overcapitalisation in terms of decreasing productivity spelt ruin on many of the more distant hill-country farms. During the same period the fertility of much of the marginal land began to diminish for it was no longer possible extensively to use artificial manures. Stock more markedly than ever showed signs of sickness, failed to reach condition, or simply died. Disheartened, many farmers walked off their land and abandoned it to weeds and second growth. The years from 1908 to 1914, so full of promise, dissolved in a welter of despondency, and 1922 'marked the changeover from the life of a frontier community to the less spectacular, but equally laborious, existence of a farming district suffering badly from land deterioration, over-capitalisation and underpopulation.'[8]

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[7] J. Cowan: *Settlers and Pioneers*, Wellington, 1940, p. 79.

The statistics in Table I tell the story. Just as the Te Kuiti region is a typical section of the northern King Country, so the history of farming in the Waitomo County is an epitome of the development of the region. By 1922-1923 the phenomenal growth of the preceding fifteen years had reached its apogee. Thereafter the number of holdings began to fall and their size to increase as mortgagors and mortgagees alike attempted to stave off disaster. The area under cultivation declined, and even as late as 1948 it had not regained the maximum of 1923. Stock numbers decreased, and the fall to 121 stock units per 100 acres of occupied land is indicative of the reduced carrying capacity. Sheep alone showed a steady, but much reduced, rate of increase.

A Changing Landscape

The next fifteen years to 1938 were difficult years as pasture land gradually diminished in area, although this decline was offset in the later years of the depression by a growing emphasis on dairy farming. The percentage of dairy cows to total cattle, together with the stock unit ratio, rose as greater attention was paid to the river flats which, when drained and limed, developed into first-class dairy land. Intensification in sheep farming went hand in hand with this metamorphosis, and the more specialised fat-lamb production replaced much of the breeding on the rolling country accessible to Te Kuiti. Thus by 1938 the northern margin of the King Country was coming into its own again as the problems of stock sickness were resolved, as correct top-dressing methods became more widely appreciated, as prices rose,

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[8] M. Westmacott: *The Northern King Country*, unpublished thesis presented for the M.A. Degree in the University of New Zealand, 1944, p. 91.

TABLE I

LAND UTILISATION AND STOCK: WAITOMO COUNTY 1908–1948

	1908	1913	1918	1923	1928	1933	1938	1943	1948
Acreage under the Plough -	1894	3083	10,759	6741	5362	5471	4726	6312	7926
Acreage under Pasture Grasses -	67,953	108,753	270,907	312,497	304,123	279,583	277,051	309,143	310,534
Acreage under Cultivation -	70,576	114,977	282,648	320,531	308,815	285,868	283,280	316,000*	319,446
Acreage Unimproved - -	—	—	233,071	229,427	240,231	171,182	166,150	172,250*	188,434
Acreage Occupied - -	—	—	515,719	549,958	549,046	457,050	449,430	488,250	507,880
Number of Holdings - -	—	—	1057	843	863	796	829	875	948
Average Size of Holdings in Acres -	—	—	488	652	636	574	542	558	536
Number of Horses - -	2679	4508	5825	4202	3194	2941	3039	3155	3361
Number of Cattle (all types) -	17,112	19,952	59,881	67,979	56,372	75,068	78,085	82,584	86,916
Number of Dairy Cows in Milk -	3183**	4451**	11,987	15,016	12,253	17,871	13,419	13,079	13,260
Percentage of Dairy to Total Cattle	*18.6*	*22.3*	*20.0*	*22.0*	*21.7*	*23.8*	*17.2*	*15.8*	*15.2*
Number of Sheep and Lambs -	44,572	95,502	158,636	179,975	230,367	289,925	447,046	518,503†	574,260
Number of Pigs - -	2488	3828	3850	5940	6272	5988	6505	5808	5366
Number of Stock Units per 100 Acres of Occupied Land -	—	—	*124*	*128*	*121*	*186*	*238*	*232*	*240*

*Estimated. Precise figures not available.
**Dairy cows both dry and in milk.
†Sheep shorn.

These data have been abstracted from official statistics of agricultural and pastoral production for the years named. The stock units have been calculated on the basis of 10 units per horse, 7 units per cow, 1 unit per sheep, and 1 unit per pig.

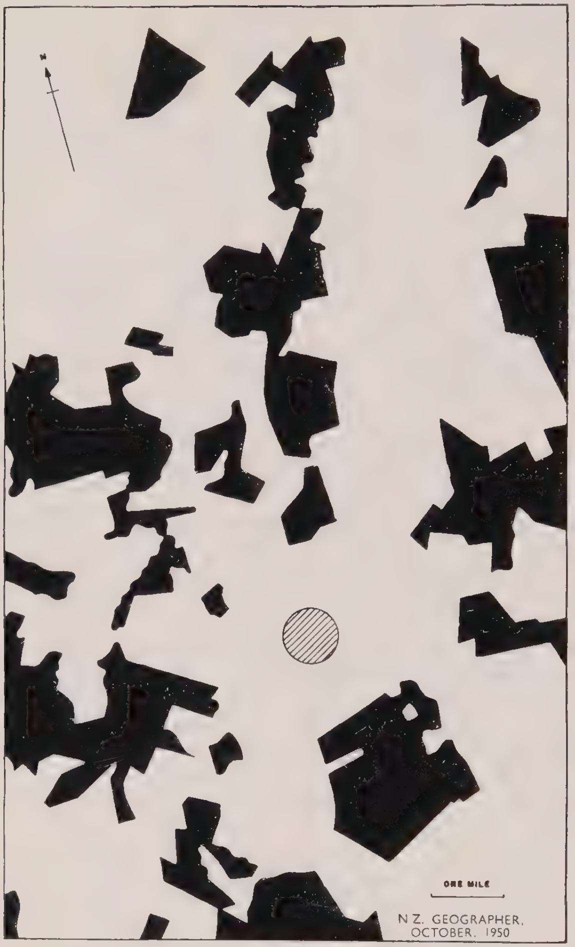

Fig. 6. The Distribution of Maori Land in Holdings of more than Fifty Acres.

and as, generally speaking, more scientific methods of farming characterised the development. By now the carrying capacity of the land in terms of stock units was almost twice the 1918 figure, and that on a smaller area of grassland and plough.

Between 1938 and 1948 the county went further ahead. As prices rose still higher the emphasis shifted again from dairy farming to the less exacting sheep-raising economies with their concomitant beef cattle. So the pattern became stabilised and the foundations of a future prosperity were laid, and the region became integrated anew with its focus, Te Kuiti. Pioneer farming as such was banished to the high plateaus of the centre and far west, the more extensive pastoralism characteristic of breeding was relegated to the limestone country and beyond, and though vestiges of these might remain, the farmers of the heart of the Te Kuiti borderland came to concern themselves dominantly with fat-lamb production, dairying and, to a certain extent, mixed farming. In short, there evolved in the farming of this northern margin of the King Country the greater diversification which is today the basis of its wealth and its regional differentiation.

In general terms the pattern of land utilisation in the area adjacent to Te Kuiti reflects this diversification of farming activity and exhibits

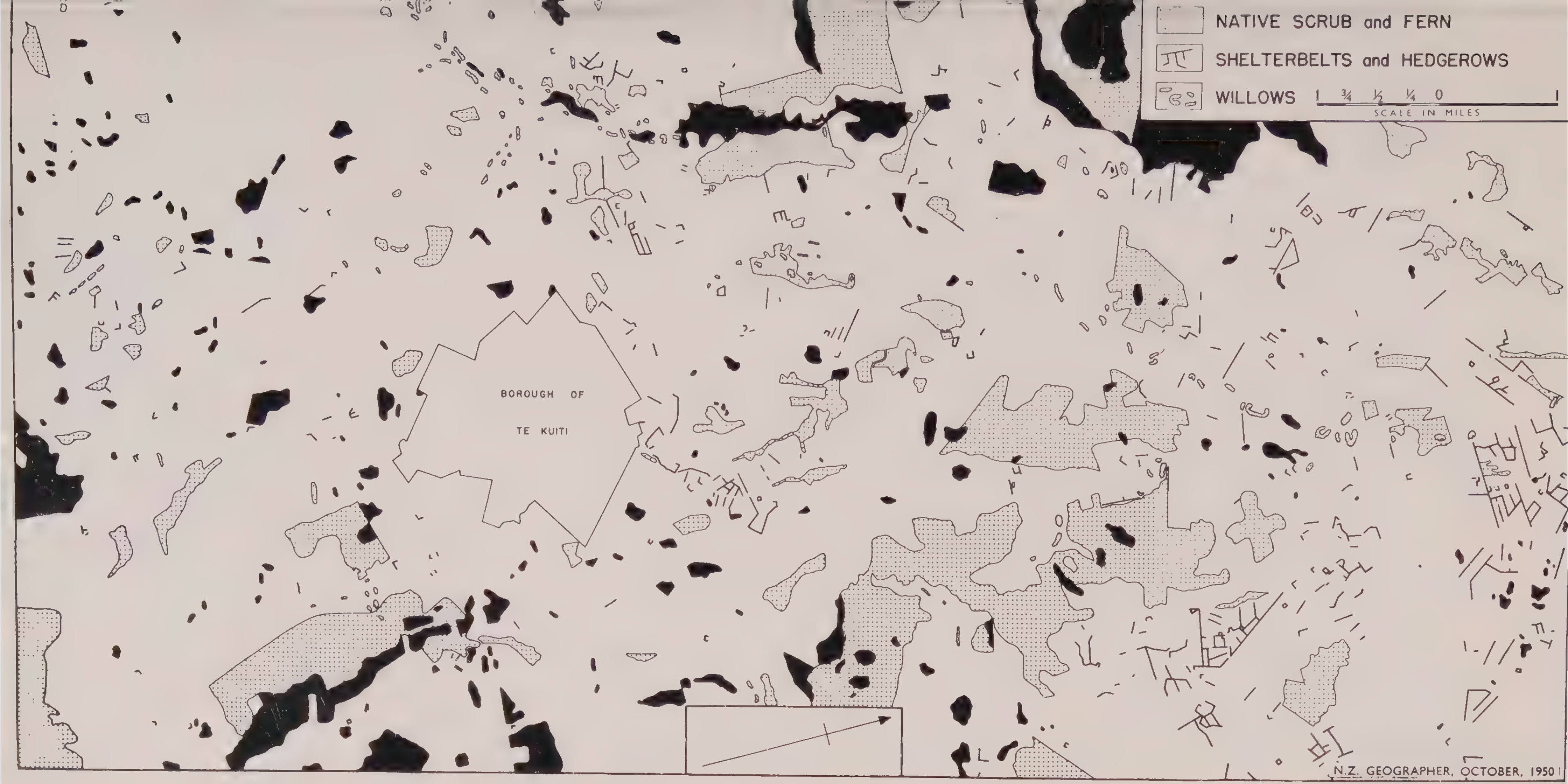

Fig. 7. The Distribution of Bush, Scrub and Miscellaneous Woodland.

certain residual and reversionary features attributable to the successive phases of development in the area. Most patent among these are the patches of weed-infestation and scrub typical of most of the land under Maori ownership. Such properties are rather haphazard in their distribution (*Fig.* 6) but there does exist a remarkable correlation between this distribution and that of land either covered entirely with manuka scrub or heavily infested with native and exotic weeds (*Figs.* 7 and 8). The Maori is not the sole offender, but he is the greatest, and the problem of pasture reversion both here and in the northern King Country generally is of such magnitude as to cause grave concern among pakeha farmers.

Where the land has remained largely in Maori hands, manuka scrub or fern, with patches of bush, often persist as a full vegetative cover. Here and there patches have been cleared to provide room for subsistence crops and perhaps a few vegetables for the Te Kuiti market, but little has been done to retain the fertility of the soil or to put it to better purpose. A few good Maori farms do exist but their very rarity serves merely to emphasise this point. The main problem, however, is fiscal. Rates levied on most Maori land are seldom, if ever, paid and the Maori contribute little towards those amenities provided for their pakeha neighbours which they too enjoy in large part and which are provided out of general funds.[9]

REVERSION ON MAORI LAND

Reversion, as such, distinguishes those holdings which at some time or other have been leased to the white man. Much of this land was taken up during the boom years of 1908 to 1910 on leases which ran for twenty-one years with the right of renewal. The owners were only too happy to grant this right during the difficult years of the depression, but today prospects of renewal are less hopeful, and with the return of the holdings to the owners not only are individual farmers penalised, but the future of farming in the King Country generally is placed in jeopardy. Most of the Maori who resume possession are unequipped for systematic farming, are unwilling to undertake the continual labour involved, or cannot resolve the problems implicit in communal ownership. Consequently the land becomes infested with noxious weeds and second growth, the labour of more than forty years is rendered nugatory, and good sheep and dairy

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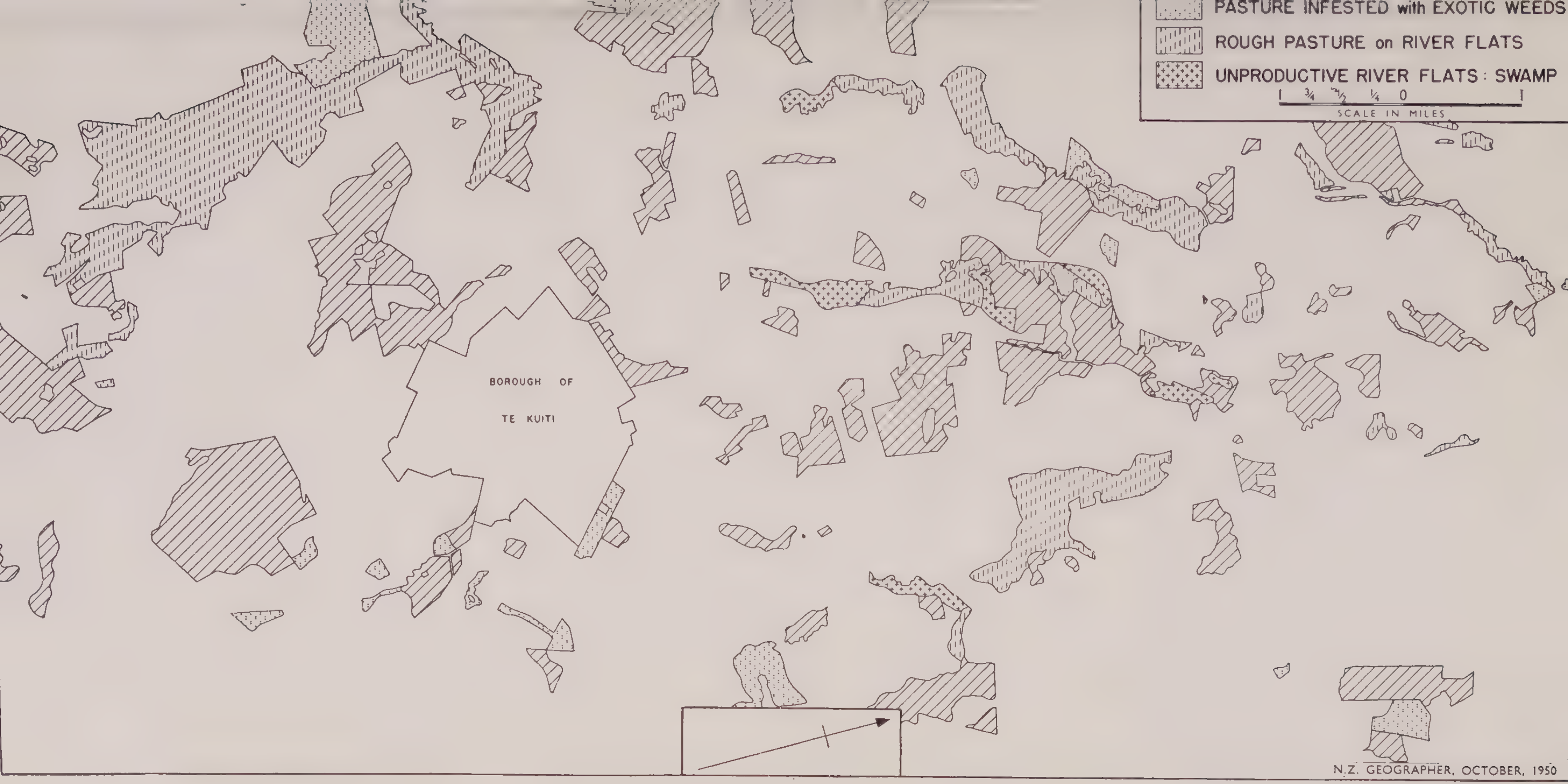
[9] An exception must be made of the holdings farmed under the management of the Maori Land Development Scheme. These pay their dues and are reasonably efficient.


PASTURE INFESTED with EXOTIC WEEDS
ROUGH PASTURE on RIVER FLATS
UNPRODUCTIVE RIVER FLATS : SWAMP
1 ¾ ½ ¼ 0 1
SCALE IN MILES
BOROUGH OF
TE KUITI

N.Z. GEOGRAPHER, OCTOBER, 1950

Fig. 8. The Distribution of Weed-infested and Rough Pasture.

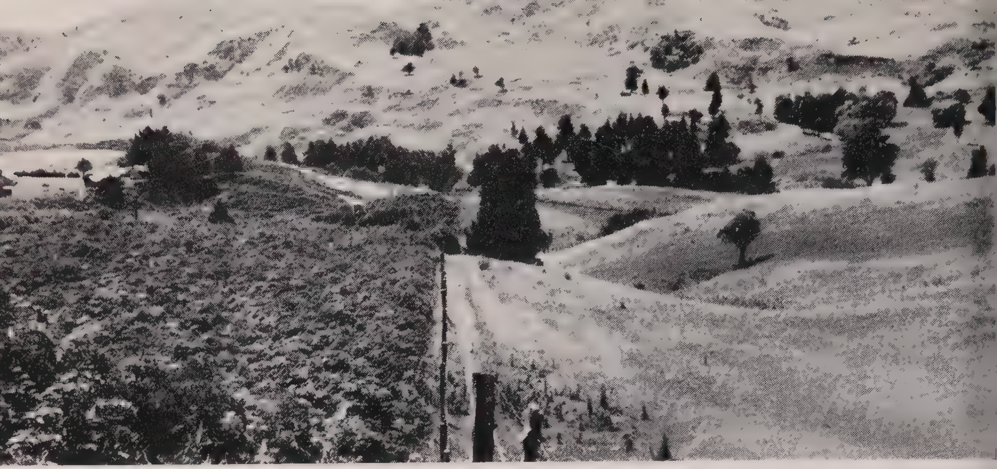


Fig. 9. A Typical Boundary Fence between Maori and Pakeha Holdings. In the background medium quality pasture characterises ignimbrite-capped hills.

country is lost. Weeds have begun to encroach on to neighbouring properties, and in many instances the land on either side of a boundary fence provides ample evidence of bad and good husbandry (*Fig*. 9). It cannot be claimed in extenuation that Maori land is marginal, for it is distributed over all types of country and all conditions of soil—in other words, over areas where the land is already successfully farmed. It is marginal only insofar as its utilisation is a reflection of poor farming.

Thus the question of Maori land looms large among the farming problems of the King Country and demands immediate attention, for many leases will expire during the next five years, particularly in the area tributary to Te Kuiti. Meanwhile the lessees, despairing of renewal, neglect fences, buildings and topdressing, and overstock the land in an attempt to secure a maximum return in a minimum of time, for little compensation is payable.

Regional Differentiation of Land Use

Within the various patterns of land utilisation, weed-infested pasture provides not only a clue to the tenurial problems prevalent in the area, but gives also some indication of the transition so typical of this northern fringe. The passage from good pasture to scrub through the intermediate reversionary stages heralds the approach to country more difficult to cultivate and topdress, just as the transition from scrub to bush is often an indication of steep slopes where the forest is vestigial. Native bush covers but a small total area, generally in attenuated patches, although more extensive stands do occur in scenic reserves and along the middle Mangapu where kahikatea was milled until a few years ago. Shelterbelts, on the other hand, exhibit a marked regional distribution and grouping. South of Te Kuiti they provide no distinct pattern on the landscape, but on the northern lowlands

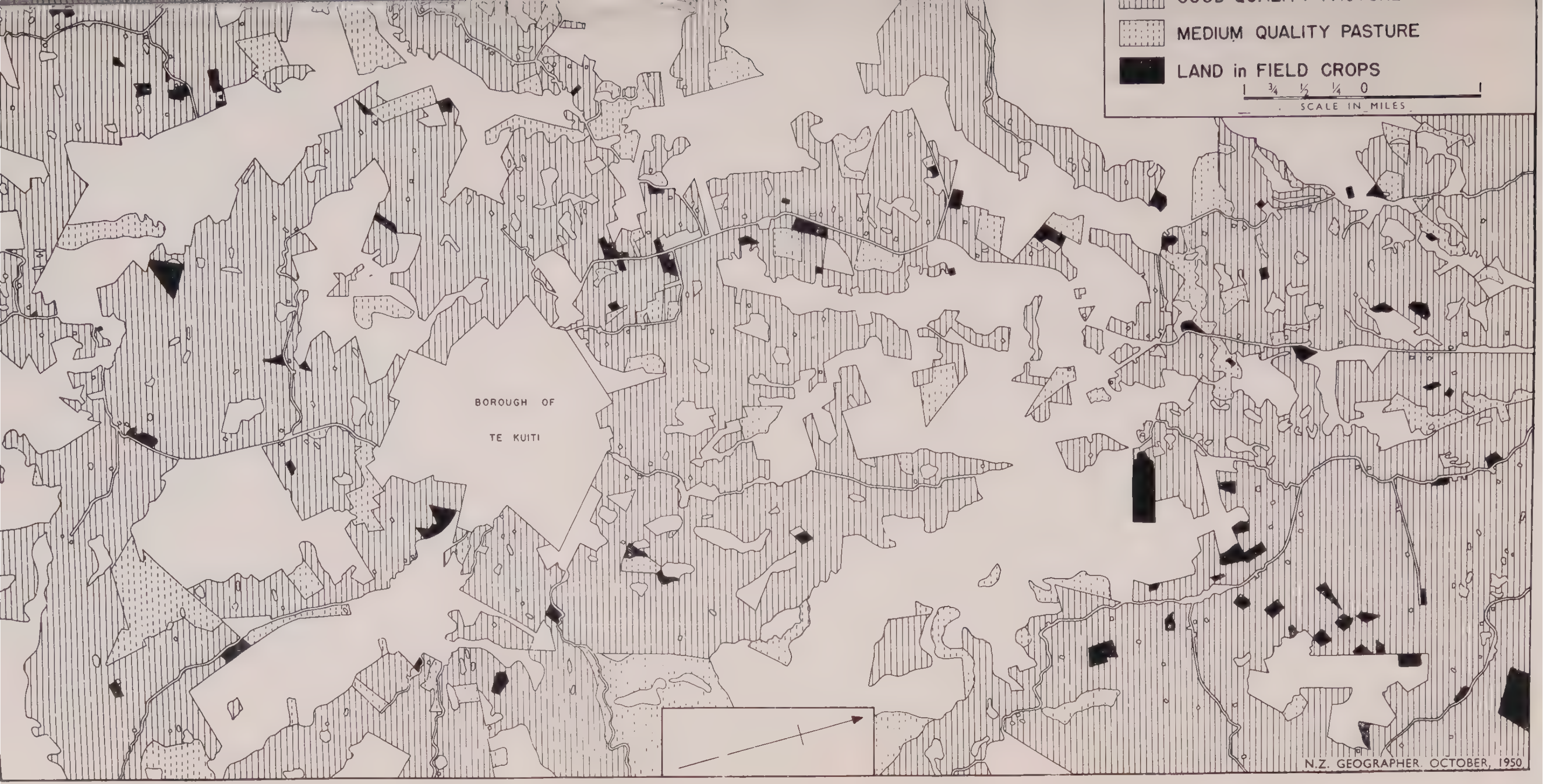


Fig. 10. The Distribution of Good and Medium Quality Pasture and Cropland.

their arrangement is typical of that of a dairying region. The patterns of distribution of arable land and of good pasture (*Fig.* 10), both overall and in their associated groupings, again emphasize the regional distinction between the north and south and between the centre and the east and west margins.

Thus, in general terms, these distributional patterns of land use provide the basis for a regional differentiation remarkable for its overall transitional character. Five broad regions may be recognised (*Fig.* 11), each with a distinctive personality which derives in the main from a predominant form of land utilisation. Within these regions some diversification is inevitable in response to personal inclination on the part of some farmers, to peculiarities in the tenurial systems, to local differences in terrain and soil and to varying economic circumstances, but each region in its totality possesses a distinctiveness that is characteristic.

Commercial Dairy Farming

To the north lies a region of wide horizons, a man-made region, where scrub and fern, flax and reeds have given way in large measure to pasture grasses and field crops. Complete uniformity does not exist and many pastures still show a sharp transition to scrub or swamp, but because of its dominant traits the region may be termed one of intensive dairy farming, and is, in fact, a southern prolongation of the commercial dairying of the Waikato-Hauraki-Piako. Peat swamp, alluvial flat and rolling downland again provide a similar physical background, but in this northern region development has been more recent and in many ways more difficult. The landscape today bears eloquent testimony to the labour of dairy farmers during the last twenty years and exhibits still the developmental stages through which it has passed. Good pasture characterises the land which possesses the advantage of a slight elevation and which was the first to be brought in; in the swamps rough pasture with its concomitant stumps and logs is more common; whilst on isolated hilltops and holdings scrub and fern remain. So are marked the three stages from a natural to a cultural vegetation, and of these three the bringing-in of the swamp proved to be the most hazardous and laborious.

Flat, criss-crossed by innumerable drains, devoid of sizeable shelter-belts, dotted with emergent tree trunks and stumps, broken by stands of kahikatea, and miserable in their winter wetness, these former

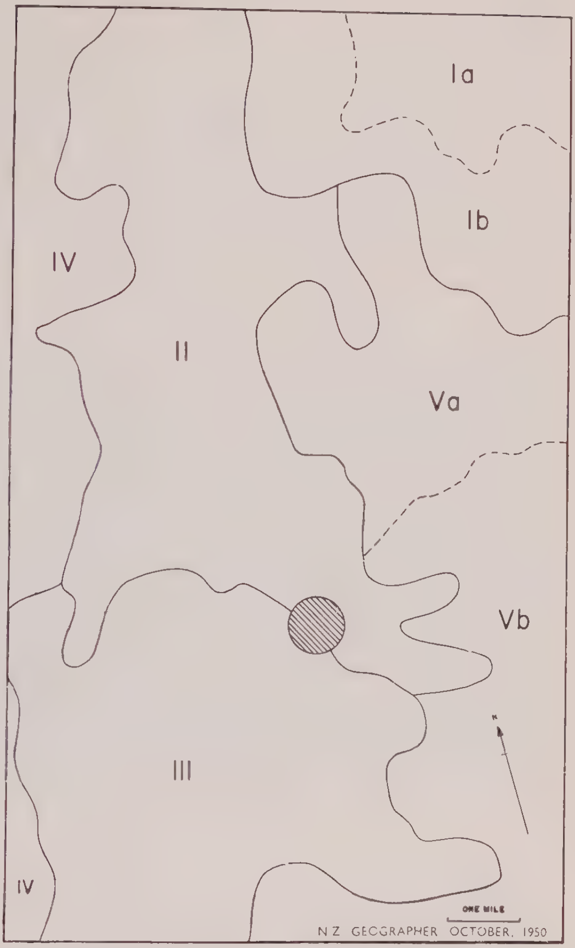


Fig. 11. Land Use Regions.

swamps constitute a distinctive element in the farming landscape (Subregion Ia). Peat which may vary in thickness from a few inches to five feet overlies an impermeable clay and breaks down into soils which tend to be sour, readily chilled and rapidly leached of fertiliser. The establishment of good pasture proved a lengthy process, for ryegrass and clover often failed to survive, though paspalum, a later introduction, seemed to withstand the rigours imposed by wet winters and dry summers. This deficiency of good grasses in the sward and the physical handicaps imposed by cold, damp, low-lying land result in a late spring growth and a subsequent hay crop low in nutritive value.

Better drainage provides the key to the amelioration of these conditions. At present it remains to a large extent uncoordinated and unsystematic—on two adjacent holdings which cover 280 acres, for example, there are five miles of open drains and no field tiles. Once drained and consolidated, and the tree remains removed, the land can be ploughed, topdressed and sown with field crops and good grasses, and shelterbelts planted to protect pastures and stock and to absorb some of the surplus ground moisture.

These peatland farms have today reached, in most cases, an intermediate stage in their development. Of the hundred acres which constitute the average holding, much still remains in rough grazing and preliminary root crops, and the good pastures already established must be carefully maintained by liberal applications of lime, basic slag and superphosphate. The high costs of fertiliser and labour make improvement of peatland a difficult and lengthy process, whilst the prohibitive prices of fencing materials mean that even the better pastures cannot be managed as well as they should be. Consequently a characteristic rawness pervades the farming landscape and there is lacking the well-kept shelterbelt-farmstead complex so typical of the older, more prosperous dairying areas. The carrying capacity of one Jersey cow to two acres underlines the developmental stage reached on much of this country.

Fig. 12. Peatland Dairy Country.

The Bordering Hill Country

Towards the margins, to the west and to the south, more elevated and rolling country supervenes, the rectilinear pattern of fence lines typical of the lower land gradually disappears, and in its place are found the irregularly-shaped paddocks of older farms where tall shelterbelts and thick hedgerows proclaim a well-established dairying economy (Subregion Ib). Holdings are slightly larger, often attaining 150 acres, with probably two-thirds in well-grassed bottom land and the rest in undulating country. These farms possess the double advantage of good feed when the neighbouring hills are burned brown in the summer months and of spring and autumn feed on the same hills when growth is retarded on the flats. Consequently the carrying capacity is much higher and sheep assume a more important role. They are not only used as scavengers to keep down the ragwort, but also for fat-lamb production; so much so that on some farms the income from fat lambs equals that derived from the dairy herd. Annual top-dressing, rotational grazing and the production of supplementary feed in the form of hay, roots, choumoellier or pampas grass all point to intelligent farm management and a prosperity not yet discernible on the lower country.[10]

Fig. 13. Maori Settlement in Region II.

Overall, however, the dairying region exhibits characteristics which distinguish it from other areas in the Te Kuiti borderland. The predominance of dairy cattle provides the basis of its differentiation, but to this must be added the vast extent of flat and near-flat land, the comparatively large area of grassland devoted to hay, the acreage under fodder crops, the close-set pattern of five to ten-acre paddocks, the shelterbelts, the artificial drainage, the relatively high density of settlement, and, above all, its tributary relationship to Otorohanga where the butter factory is located. Patches of poor pasture and scrub, nevertheless, herald the transition to the more variegated pattern of land use to the south and west just as the increasing proportion of sheep in the farm stock towards the margins of the region point to the more extensive and less onerous farm economies in the area adjacent to Te Kuiti.

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[10] For a description of a typical farm on this type of country see K. M. Montgomery: 'An Otorohanga Dairy Farm', *N.Z. Journ. of Agric.*, Vol. 74, 1947, pp. 171–178.

South and west of Hangatiki the character of the landscape changes from the wide expanse of dairy flats to an alternation of river bottom land and rolling ridge country, where the farm economies are distinguished by their variety (Region II). Dairying remains significant, but is no longer dominant, and is confined to the more favoured areas of better land of easy access, in particular, to the gently rolling mudstone country and drained bottom land adjacent to the main roads. The cream still travels to the Otorohanga factory, but round Te Kuiti itself several small farms produce milk for the urban market and so constitute a distinctive group. Farms of 150-250 acres which carry both dairy cattle and considerable numbers of sheep become typical, and immediately northwest of Te Kuiti a thousand-acre holding devoted to fat-lamb and beef production marks the transition to the sheep country of the southwest. Scattered throughout the region are Maori holdings, some farmed, some derelict, but in the main characterised by their dilapidated housing, by reversion on hill country, by swamp on the flats, and, in parts, by tentative efforts towards a subsistence agriculture based on maize and kumara.

Dairy cattle, sheep, beef cattle, Maori plots, reverting pastures, useless swamps—these are the cultural facets in a farming landscape spread over hill and river plain. The combinations and permutations of these elements are diverse but may be resolved into two major groups; the good farms adjacent to the roads, and the partially developed holdings located on poorer country or farmed less efficiently. On a typical farm of 200 acres in the first category, 150 acres are in good exotic grasses and twenty acres in supplementary feed, forty milking cows and 200 ewes are grazed and some goats kept to eat down the blackberry. An example of the second group is a holding of 180 acres on similar country with forty acres under the plough for vegetables and kumara in season, and carrying four cows. On this farm much of the income is derived from casual labour, for which a great demand exists in the area.

LABOUR PROBLEMS

Labour, in fact, constitutes a hurdle that is well-nigh unsurmountable for the small farmer. Neighbourly cooperation and the employment of casual workers serves merely to defer a problem that must be solved if such areas as the northern King Country are to be developed to their full capacity. Other difficulties exist, the cost of fencing and the non-availability of fertiliser at the right time ranking high among them, but labour shortages are responsible to a high degree for much of the inefficient farming and the reversion of pastures, and take the form of actual lack of hands on pakeha farms or the disinclination to work on the part of the Maori. Consequently there is no desire among small farmers to extend their commitments, and this, coupled with tenurial problems, has led to the persistence in this transitional region of small dairy farms, as in the Oparure area, and to an increased attention to sheep as a major source of farm income.

The pattern of settlement within the region provides a key to this variety of occupance—the close grouping at Opurare and Hangatiki; the more widely but evenly spaced dairying and fat-lamb farms adjacent to the main road; the dispersal towards the eastern, southern and western margins of farms concerned solely with sheep-raising; and perhaps most significant of all, the first traces of scattered small nucleated groups, often relatively distant from the roads, which indicate Maori holdings. Good grassland on rolling country and alluvial flat, weed-infested pasture, scrub and marsh, the distribution of dairy cattle, sheep and beef cattle may all be correlated with this pattern of settlement to provide a mosaic of land use distinct in its variety and in its transitional character.

Fat-Lamb Country

This variety in the landscape persists southwestwards towards the Waipa-Mokau watershed (Region III), but the component elements bear different relationships and are dominated by one particular feature—the emphasis on fat-lamb production from Southdown-Romney crossbreds. The Tertiary mudstones and sandstones which underly most of the area have been moulded into steeply rolling country broken by slip scars and slumped clays, but carry good pastures despite a tendency to dry out in the summer months. Only on the highest points where looser, drier soils are developed on the sandstones and ignimbrite do the ryegrass-clover and cocksfoot associations yield to danthonia and other less nutritive grasses. The more general occurrence of ignimbrite on the higher levels emphasises the approach to the plateau country of the south and east, and is distinguished in most localities by a predominance of scrub and rough grazing, especially in the south towards the Mokau. Maori land with its typical forms of land utilisation is again in evidence, but dairy farming becomes relatively insignificant among the farm economies of the region. The eight dairy farms of the Whataroa settlement on Troopers Road at one and the same time constitute an anomaly and presage the advance of more intensive farming into the more easily worked sheep country. These eight farms, totalling 839 acres, were cut out of a former sheep farm of 1256 acres and were occupied in 1946 by returned servicemen. The remainder of the holding extends into the swampy bottom land of the Mangarama, and until satisfactory drainage is possible must remain primarily in rough grazing for polled Angus and Herefords.

The individuality of this region, then, derives essentially from the distinctive sheep-farming economy on 'papa' country, where farms vary in size from 400 to 800 acres. Three to five sheep per acre represents an average carrying capacity, so that total stock numbers on the smaller units are of the order of 1200 sheep, with 150 beef cattle to keep down the fern. On larger farms sheep tend to assume greater numbers, proportionately, than cattle, but in general terms this ratio between sheep and cattle is characteristic of the region and points to well-established, efficiently-managed farm economies based on rotational grazing, regular topdressing and selective stocking, with little need for supplementary fodder crops. The absence of arable land is distinctive. Most of the farms have been occupied for at least twenty-five years, some as long as forty; the majority are freehold and have remained in the family for two generations; but all, with their high fertility, good swards and pleasant tree-sheltered homesteads, possess an air of wellbeing and permanence that is so lacking in other parts of the hill country of the northern King Country.

In contrast, the bottom land of the Mangarama, where five hundred beasts run on a thousand acres, and the scrub-covered, weed-infested holdings under Maori ownership represent wasted assets. Their potential value is high, although the more elevated ignimbrite caps must be excepted. Where the familiar linear pattern of settlement disappears, where metalled roads come to an end, where the field pattern breaks down into a mere patchwork round a huddle of small dwellings—there lies wasted land symbolic of a cultural frontier that has been forced to retreat.

SHEEP-BREEDING REGIONS

Between the sheep-raising regions on the mudstone and the limestone a close liaison has always existed, but their lines of demarcation have remained distinct despite a tendency for sheep breeding to be developed in parts of the 'papa' country as the result of personal inclination on the part of some farmers. The sharp transition from mudstone to limestone is reflected in the rapid reorientation of farm economies, for sheep cannot be fattened successfully on limestone country. Rather is this breeding country, producing big-boned, sturdy Romney stock for replacements not only in the fattening and mixed farming areas of the Te Kuiti region, but also on the dairy farms of the Waikato. Hereford beef cattle are associated in this wider pastoral economy, again as stores destined for lowland pastures. The larger holdings breeding Romneys and Herefords near Waitomo and behind Oparure proclaim the transition from the central depression to the higher limestone plateau (Subregion IV). Patches of scrub and bush, and of infested pasture land near Oparure, still remain, but the dominant features of the farming landscape west of Troopers Road northwards from Arapae are the large paddocks with good ryegrass-clover swards on easy country, and the water troughs typical of a region lacking surface water.

This trait is probably more marked in the eastern limestone country (Subregion Vb) where the pattern of fields tends to assume the most extraordinary lineaments as fencelines mark the access to short surface streams or *tomo*. Where water has been obtained by means of bores and piped round the farm, the paddocks adopt a more regular shape and size, with consequent benefit to the management of both pastures and stock.

Diversity in the East

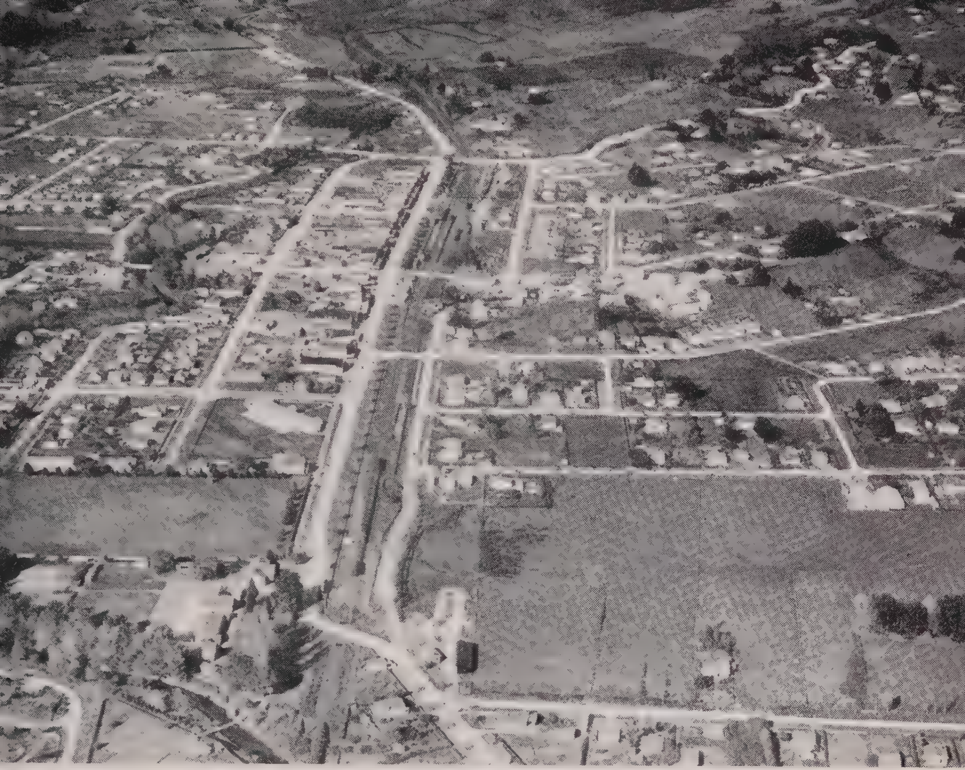
The eastern region as a whole, however, lacks the homogeneity of its western counterpart. Limestone comes to the surface extensively only to the east and southeast of Te Kuiti. To the northeast lies the transitional area of the Parawhau Plateau where ignimbrite caps much of the surface and half the total area is covered in remnants of bush, manuka scrub, bracken and gorse (Subregion Va). The lower valleys of the Mangaorino and Mangarapa, which drain northwards to the Mangapu, consist in the main of extensive swamp and rough grazing, the haunt of wildfowl and a few beef cattle. Settlement is sparse and confined chiefly to groups of Maori who maintain a precarious subsistence agriculture by burning off small patches of scrub and planting maize in the resultant ash. Before 1918 a number of pioneer settlers attempted to open up the area, but, unable to meet their commitments in the difficult years after the war, they abandoned their farms to scrub and fern. However, today, new attempts are being made to bring the country back into production, whilst on the northern fringes dairy farming, already established along the Puketawai Road, is pushing southwards. Eastwards towards the higher greywacke ridges of the Otu-ao-roa Plateau a sprinkling of sheep and beef cattle proclaim the extensive pastoralism of the Rangitoto Range area with its thousand-acre holdings.

Along the old Te Kuiti Road within two miles of the town, a series of small well-kept dairy farms with their small paddocks, cowbails and shelterbelts indicates the transition to Region II, whilst to the southeast extend the holdings devoted to sheep breeding. Farms vary in size from 200 to 1000 acres and carry, on the average, two Romneys to the acre. Fertiliser is essential to the proper development of this breeding country, so that good access is of prime importance, and the familiar linear characteristics of settlement again appear, but in this case the problem of reverting Maori land is absent since most of the farms were purchased and are not held on lease. The only extensive section of poor land adjacent to Te Kuiti lies along the western margin where a long belt of bush and scrub clothes the steep face of the limestone fronting the valley of the Mangaokewa.

Te Kuiti and the Northern King Country

Te Kuiti itself, then, possesses the characteristics of marginal location, situated as it is near the borders of two types of sheep country and of a third region remarkable for its varied farming landscape. Although Otorohanga must prove a focus for much of the dairy country, it is a small urban settlement of less than a thousand inhabitants, and moreover has no attraction for the sheep farmer. Consequently it is Te Kuiti which integrates the whole borderland, for there converge the main routes, and there has been developed the commercial centre of the northern King Country—a function which dates back to the last years of the nineteenth century when the town was the railhead from which settlement first extended.

In those days Te Kuiti, with its three stores, three hotels, a blacksmith and a saddler, possessed all the characteristics of a frontier town. The original Maori village at Tokangamutu, a short distance to the south, eventually disappeared as Te Kuiti grew with the influx of



ig. 14. Te Kuiti from the North: Route Centre and Commercial Capital of the Northern King Country. *Photo: Whites Aviation*

ettlers and with the increasing activity as the railway pushed slowly outhwards. Crowded with engineers, surveyors, bushmen, teamsters nd speculators, the town hummed with noisy activity until 1898 when he railway was completed as far as the Poro-o-tarao tunnel and the onstruction gangs and railhead moved on. However the close associ- tion of the town with the railway has never died. Railway houses till line the northern approach to the town and a street west of the ailway station, the locomotive depot remains, and freight trains may e broken down from 650 to 350 tons preparatory to their haul over he steep gradients of the hill country.[11]

TWENTIETH-CENTURY GROWTH

The early years of the twentieth century saw Te Kuiti grow as the ommercial centre of this northern fringe of the King Country, despite e difficulties of land tenure both in the town and the surrounding rea. Maori ownership of the flat land near the railway forced pakeha ettlement to the hill slopes east of the Mangaokewa where freehold

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These are average figures. Much, of course, depends on the type of locomotive.

land was acquired. The commercial core, of necessity, continued to develop along the main road adjacent to the railway, and it was not until 1924 that negotiations for the purchase of this land were completed, but at such high values that the town must forever feel the burden of debt. The large number of vacant sections between the commercial core and the surrounding hill slopes is a reflection of the inflated land values within the borough, the boundaries of which were gazetted in 1910 when the population had reached the required total of one thousand. In 1945 the population numbered 2720—a growth not remarkably rapid when compared with that of any other North Island town of like size, but nevertheless a fair index to the vicissitudes of development in the Te Kuiti region.

Functions of Te Kuiti

With respect to this region Te Kuiti has three major functions. Firstly, it acts as a commercial and an administrative centre with banks, stock and station agents, retail businesses and government offices, especially those connected with land development. The growth of small industries to supply the needs of farmers is another facet of this function. The manufacture of gates, the servicing of farm equipment, the crushing of lime, and the large-scale baking of bread are all directed at the rural market.

Secondly, by virtue of the nexus of routes, it operates as a collecting and distributing centre. Through the stockyards pass sheep and cattle from the breeding country of the limestone plateaus, and culled ewes, store lambs and fat stock destined for the Waikato and the freezing works. Wool; timber and coal from Mangapehi and the eastern ranges; serpentine from the Aria district; and lime from the neighbouring quarries all pass through the Te Kuiti hub. In terms of outward railway traffic, Te Kuiti in 1949 occupied ninth place in the North Island as a heavy goods centre, especially for lime, of which only sixty percent of the potential may be handled because of the dearth of waggons; eighth place as a timber centre; and ninth place as a sheep-handling depot. From the distributional point of view, Te Kuiti serves 10,000 people in an area bounded by the coast on the west and the Rangitoto Range on the east, with Kinohaku, Waitomo and Hangatiki as the northern limits and Awakino, Mokauiti and Mangapehi as the southern. Bread and meat are taken out as far as thirty miles by service car, whilst even further afield, farmers draw their supplies of groceries and equipment. Outward-bound passengers by rail make Te Kuiti the fourth station in the North Island in the number of tickets issued.

Thirdly, the town functions as a residential, recreational and educational centre; in the first respect primarily for those occupied in local industries and in servicing the farming community of the region, but in the second and third for the whole population of the borderland and beyond. The District High School, cinemas, clubs, sports grounds, the office of the local newspaper, and all the other appurtenances of social welfare are situated in the borough and demonstrate the essential unity of town and country. From Te Kuiti forty or fifty years ago many of the pioneers set out with bullock train and packhorse to hew out their farms from bush and scrub. Today a car covers the same distance in one tenth of the time it took then, but Te Kuiti has remained as the main contact with the outside world, integrating the varied economies of its region and reflecting in its functions, past and present, those characteristic transitional elements which give to the Te Kuiti borderland its geographic personality.

The Region and the Future

Yet the borderland is young, even in terms of New Zealand landscapes, and many of its problems remain unsolved. In large part they are a legacy of the past and admit of no easy solution. But if New Zealand is to produce more food in a hungry world, if the proportion of rural population in the dominion is to increase instead of decrease, and if the hill country is to play its part in the future development of farming in the interior of the North Island, the neglected land so typical of the northern King Country as a whole must be fully utilised. In short, the agricultural landscapes of the northern King Country will long retain their transitional characteristics and will evince in their patterns of land use the endeavours of its component farming communities, successful, misguided, inefficient, or thwarted, as the case may be.

THE TAKAKA VALLEY, NORTHWEST NELSON

A. J. ROSE

THE PROVINCIAL DISTRICTS of Nelson and Marlborough together represent one of the most mountainous and sparsely settled parts of New Zealand. In this northern quarter of the South Island there lived in 1945 only 77,938 people, with an average density of 5.2 persons per square mile. One of the most important factors helping to explain these figures is that land fit for agricultural settlement is strictly limited. On the small peripheral valley plains the rural population is dense by New Zealand standards; in the hilly areas, where some extensive farming is practised, settlement is scattered and population is small; the mountains which occupy the greater part of the land are uninhabited. Those small areas favourable to human habitation are generally confined to the series of alluvium-filled, fault-angle depressions which open towards Cook Strait in the north and soon become lost in the tumbled mountain ranges away from the coast.

One of the most distinctive areas in this diversified region is that bounded in the south by the Buller River, and in the east by the Motueka. Rarely could the expression 'a beggar's mantle with a fringe of gold' be more aptly applied. This rugged tract occupies 4000 square miles. The only considerable urban centre is the coal-exporting town of Westport (4686) in the extreme southwest. Elsewhere settlements are either small mining towns or restricted rural areas of dairy farming situated peripherally in relation to the forest-clad mountain fastness which occupies six-sevenths of the region. The wealth of the Nelson northwest is taken from the coalfields and the river plains of the remaining seventh. The interior remains unutilised, uninhabited and incompletely mapped, a wilderness of rain-drenched mountains hitherto inhospitable to man.

Of a total of 13,000 people in the region half is dependent on coal mining and another large fraction on timber milling. In localities where the accessible coal and forest resources have been exhausted the people now practise farming. This division of community occupations roughly corresponds to another, wider division of regional interests. The dairying districts of the Aorere and Takaka valleys in the north, and the hill-girt inland basin of Murchison in the south, look to Nelson and to the more distant capital city of Wellington for urban services. Separated from Murchison by he difficult Buller orge, the coal-ining and saw-illing centres of the ower Buller district nd the coastlands orth of Westport are riented towards hristchurch with hich they now have irect rail connections. he lower Karamea alley alone in this outhwestern area ases its economy on e dairy cow.

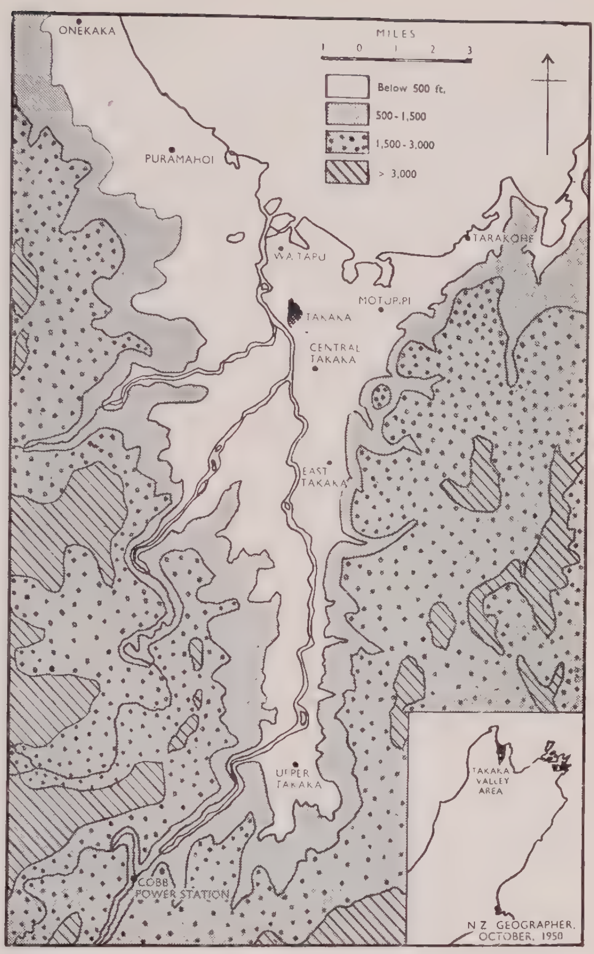


Fig. 1. The Setting of the Takaka Valley between the Pikikirunas to the East and the Douglas Mountains to the West.

In this singularly inhospitable region the terrain helps to confine oth communications and settlement to the margins. Only in two ses have roads been thrown across the mountain barriers. The ntional importance of the tortuous routeway down the Buller is t great, although locally its significance is considerable. North-est from the Tasman Bay lowlands another road crosses the Pikiki-na Range, a seaward projection of the main highland mass. From e summit of this range, known locally as the Takaka Hill, the Takaka lley lies 2500 feet below; it contrasts sharply with the surrounding ountain flanks and widens out to a considerable lowland as it stretches rth to the shores of Golden Bay.

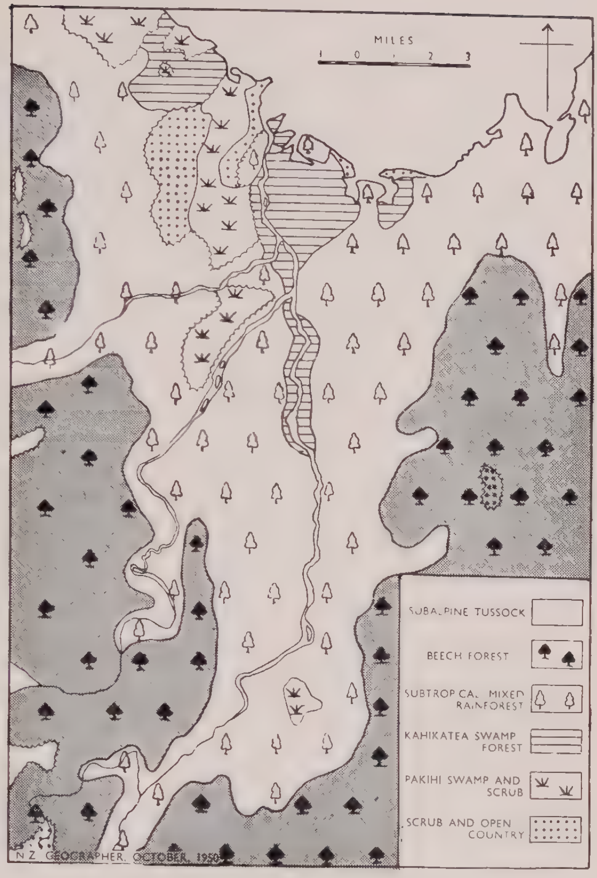
The sixteen-mile-long Takaka valley is hemmed in to the east by the wall of the Pikikirunas and to the west by the higher, forested slopes of the Douglas Mountains, and lies open only to the north. The imposing scarp-like face of the Pikikirunas offers no gap to accommodate an easy road to the Tasman Bay lowland. Their marble-capped barrier must be surmounted before the outside world can be reached. To the west of the Takaka lowland the river gorges lead only into wild mountains. Access to the open sea is hampered by extensive mudflats and by the shallowness of the estuaries which are being rapidly silted up. The eighty-six square miles of land which are the heart of Takaka County have no easy line of communication with the outside world.

The valley floor is by no means uniform in character. In the north-east variations in surface features take the form of a series of low cuestas, between which the surface has little slope, the country being composed of later, less resistant deposits. In the northwest spurs reach down from the Haupiris to interrupt terrace surfaces which to the south are more fully developed and to the east of the river are lower and of more recent origin. Between these runs a narrow strip of floodplain of varying width along the entire length of the valley broadening only in the north about the township of Takaka. Attenuated ribbons of floodplain also follow the courses of the main tributary rivers, the Anatoki and Waingaro. For the southern third of its length the valley is narrowly constricted between the opposing mountain walls, here only a mile apart. This area is extremely diverse, with floodplain, terraces, shingle fans and hills of marble, the whole having an uneven surface.

CLIMATE

In spite of a high annual rainfall of between seventy-five and eighty inches the valley enjoys a large number of sunshine hours. The intensity of precipitation is a corollary of this; the rain falls on only 135 days during the year. Only forty percent of the annual total falls during the summer and autumn period. Warm summers and the strong dry southerly winds which frequently sweep down the valley, rapidly reduce the moisture in the soil, and three weeks without rain are sufficient to cause pastures to dry out.

The daily weather depends on the changing disposition of pressure over New Zealand. With the movement of a low pressure system across the Tasman, clouds drive in from the north and northeast.



N Z GEOGRAPHER, OCTOBER, 1950

Fig. 2. Primitive Vegetation Cover

Orographically intensified by the lift of the air over the mountains the normal cyclonic rain often comes in a steady downpour. Four or five inches of rain in one day is not rare in the lower valley, while during the night of 27 March 1948, seven and a half inches fell in five hours at the Cobb River power station. At such times there is always danger of flooding in the lower valley unless the wind swings rapidly to a westerly quarter. With the wind from the south temperatures drop, and in winter and spring snow appears on the mountain summits. Snow lying below 1500 feet is uncommon. After the passage of a depression, the air is still and clear, and during winter frosty nights are common, tempered by warm sunny days.

This climate with its heavy rainfall, high number of sunshine hours, moderate and clear snow-free winters and pleasant summer temperatures is typical of west coast New Zealand, although the strong and persistent westerlies so common elsewhere are largely deflected and prevented from reaching the valley by the western mountains. It is unfortunate that the richest and most densely settled portion of the valley is subject to periodic flooding. Even the townhip is not immune when the usually clear river swells to a muddy torrent and overflows its banks.

Under these conditions there developed a dense cover of rain-forest, with swamp forest on the low-lying poorly-drained areas in the north. At first the forest presented a barrier to land development, but after 1860 the fine stands of millable trees—rimu, matai, totara, and especially the giant kahikatea—were converted into a valuable resource by the introduction of timber milling. In 1840 the sombre-hued tangle of lianes, ferns and bushes, crowned by tall forest trees was an unbroken sea of vegetation covering four-fifths of the valley area. Coastal vegetation on the sand dunes and on the limestone cliffs in the northeast was strictly limited, while the river-bed associations formed only a narrow discontinuous ribbon along the length of the valley. The only other major association was that on the pakihi terraces in the west and northwest. This distinctive vegetation characterised by stunted manuka and dark green sedges gave a dreary appearance to thousands of acres of flat land in this area. Even today the original cover is little changed.

Soils

Under forest conditions and a heavy rainfall podsolic soils developed. On the pakihi the podsols are mature and a thin layer of peat overlies an horizon of leached white clay which passes downward into a zone of iron concretion—a hard pan which prevents easy drainage of the poor acidic soil. Yellow pine (*Dacrydium intermedium*) stumps are to be found beneath the surface and it is possible that this podocarp accelerated the formation of a podsolic soil and hence ultimately led to its own destruction. Elsewhere hard pans underlie all the older soils in the valley, but nowhere are they as fully developed as in the pakihi. The recently deposited alluvial soils of the floodplain vary greatly in depth and cover clean river gravel. Higher parts are well drained, but the hollows where the soil is deeper are often swampy in winter.

Earliest Settlement

The sixty years after 1842 brought about great changes in the isolated, bush-clad Takaka valley. The forest cover was either modified or destroyed and the foundations of the present day economy were laid. Maori occupance did little to modify the landscape. In 1842 the small scattered native settlements were located near the coast, always adjacent to navigable water. Small plots were cleared for growing vegetables. Representatives of the last of a long series of invasions from the

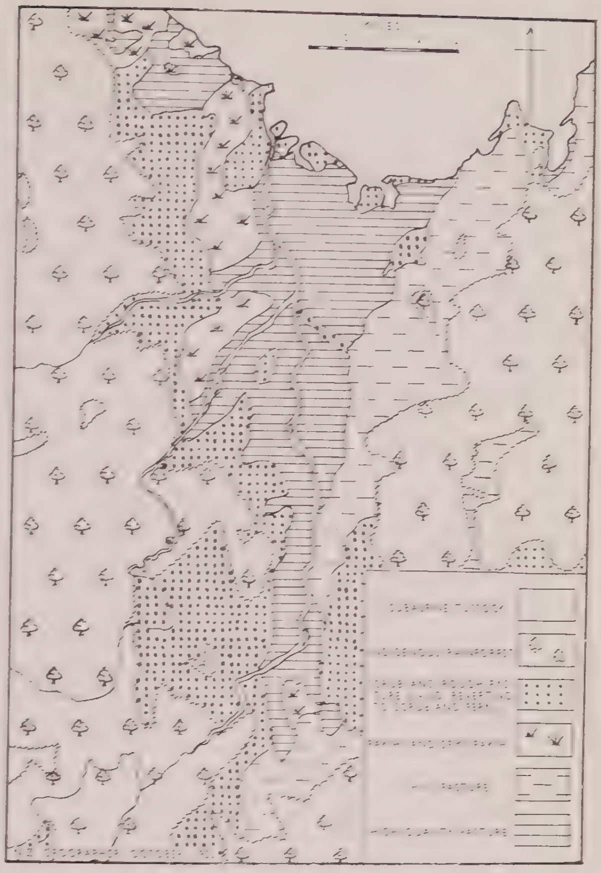


Fig. 3. Vegetational Cover, 1950.

North Island, these Maori people did not remain long in the valley after the Europeans began to arrive. Takaka was opened to white settlement when the area was obtained from the Maori by the New Zealand Company's 'Second Deed of Purchase' signed at Kapiti in 1839. But not until 1842 did the first Europeans visit the valley. In March of that year the surveyor Tuckett returned to the impoverished, land-hungry settlement of Nelson with samples of coal and limestone from Motupipi on the shores of 'Coal Bay'. Although the coal proved to be of very low quality and was not exploited to any extent, a survey was made of the valley and another restricted area of flat land became known to the Nelson settlers.

The first small party of permanent settlers arrived at Motupipi in 1845, and for the next ten years pioneers trickled slowly into the valley. As the only communication was by sea these people built homes for themselves in the areas where Maori settlements were concentrated. By 1855 settlement in the northeast was dense enough to warrant the surveying of a town site at Clifton. But the town centre for the valley never grew on this site, for by about this time the deep water channel of the Motupipi River, the original port, had become severely silted. The port was moved to Waitapu on another distributary of the main river. Then too, gold had been discovered, and by the end of 1857 some 300 men were working the small alluvial deposits in the Waikoropupu-Anatoki area. To serve this temporary population a nucleus of permanent settlement was established at Kotinga.

Despite the fact that the period of mineral exploitation in the valley was brief and the riches won were not great, much was done during this time to lay the foundations of a successful settlement. The discovery of coal led to the first survey and attracted some settlers, and the development of the goldfields brought many people, some of whom stayed to make their homes in the area. The township of Takaka developed centrally in relation to the three early nuclei of population —Motupipi, Waitapu and Kotinga—while the end of the period saw the first movement of people further up the valley away from the sea.

Timber Milling 1860–1895

This inland movement was accentuated by the development of communications across the Pikikirunas. Before 1860 the jagged limestone terrain along the summit of the range had defied attempts to drive stock overland, but in that year the first flock of sheep was brought to the upper valley. About this time, also, small clearings were beginning to appear throughout the valley as the forest gave way to small farms. The establishment of the first sawmill in 1860 began a period of forty years in which timber figured as the chief export from Waitapu. Small mills sprang up all over the valley and assured a cash return from the forest which had formerly been an enemy to be destroyed by the firebrand and the axe. But like all extractive industries, milling declined as the supply of raw material became exhausted. Of the timber industry in the valley, Park wrote in 1889: ‘A few years must see the end of this important trade, as the best and most accessible trees have already been cut down, and no steps whatever have been made to perpetuate the forest by planting.’[1]

General Farming to 1895

The settlers found little need to replant the forest for they were farmers. Many of them had obtained enough money in gold mining or timber milling to purchase smallholdings and these were developed as mixed farms. Indeed, the expansion of farming kept pace with timber milling and from 1858 an increasing flow of agricultural products was exported by the regular 'cutter' service to Nelson and Wellington. Small farms replaced the bush. At first only a few acres near the homesteads were fully utilised; they alone were fenced to prevent the intrusion of the animals which lived on the sparse feed amongst the bracken, blackberry and gorse which replaced the forest over large areas. Cultivated crops included wheat and other cereals, potatoes, peas and vegetables which were grown on the relatively small fenced areas. Orchards and European trees were planted extensively. Soon willows and poplars grew densely along the river banks, and conifers grew in some places to form shelterbelts and woodlots.

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[1] J. Park: ‘Collingwood County’, *Reports on Geological Exploration,* 1888–1889, p. 199.

The Growth of Takaka

Takaka township had grown as communications had developed and with general activity in the valley, for it acted primarily as a marketing and social centre for the farmers and millers. In 1863 it became the headquarters of the local road board which did much to improve the already existing roads and bush tracks, the original pattern of which is retained by the highways of today. With the establishment of a telegraph office in 1880 the future of the village as the business centre for the valley was assured. The graded track which was cut across the Pikikirunas (Takaka Hill) at the same time as the telegraph line was built gave the area its first relatively easy overland connection with the Tasman Bay lowland. Eleven years later this track was joined to the township by an all-weather road down the eastern side of the valley. These developments led to the decline of he port of Waitapu, for the overland route provided a more reliable connection with Nelson than did the coastal shipping service, often hampered as it was by westerly gales about Separation Point.

By 1895, when timber milling was losing its dominant position in the economy of the valley, the landscape was characterised by small remnant patches of forest, by the growth of useless scrub and weeds in many localities, and by the number of small farms with heir frame houses, surroundings of young English trees, and fields of crops and pasture. Bridges crossed the river in several places, nd smaller structures spanned the tributary streams. Takaka, now busy market village strung along a single main street, was the focus of a road system which gave access to all parts of the district. A good road connected the valley with Collingwood, and the surveyed rack across the Pikikirunas gave the valley a direct land route into the Tasman Bay lowland. In addition, the anchorage at Waitapu, despite its shallowness, allowed for a regular coastal service between the Golden Bay district and Nelson. Takaka valley had experienced half a century of material progress based largely on the extractive exploitation of limited resources of minerals and timber. During the next half century emphasis was placed on production from a more permanent source; milling and mixed farming were replaced by dairying.

DAIRYING 1895-1949

The era which began with the establishment of the first dairy factory in 1895 is likely to continue into the future. Many of the elements introduced during the early years of this period are prominent in the landscape of today. Petrol-driven milking machines allowed for an increase in the size of herds which in turn required improved and larger cowsheds. These were also needed to house the machinery which included cream separators after about 1910. Developments were greatly assisted by the construction at Tarakohe in 1911 of a cement works, for concrete came to be used extensively in building cowyards and was essential in eliminating mud. After 1918 cream collection by lorries made necessary improved means of communication. Farm crops changed too, and grassland farming became dominant in an area which had hitherto resorted to mixed farming. Large tracts of useless scrub and weeds were replaced by pasture. At the same time the relative importance of sheep farming decreased. Since 1920 the sheep population has remained almost stationary; dairy production has almost quadrupled.

The development of hydroelectricity gave a further impetus to improvements in the material wellbeing of a steadily increasing population. Within ten years of the establishment of a small generator at Waikoropupu in 1928 practically all the lower valley was reticulated. Power lines, strung on tall concrete poles following the roads and cutting across country became prominent features of the landscape. Electricity replaced petroleum lamps and carbide gas in domestic lighting and usurped the position of petrol motors in the cowsheds.

All these things have played their part in moulding the appearance of the Takaka valley. Here as elsewhere 'today is but a point on a line, the development of which may be reconstructed from its beginning'.[2]

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[2] Carl O. Sauer: 'Foreword to Historical Geography', *Annals Assoc. Amer. Geogrs.*, Vol. 31, No. 1, 1941, p. 9.

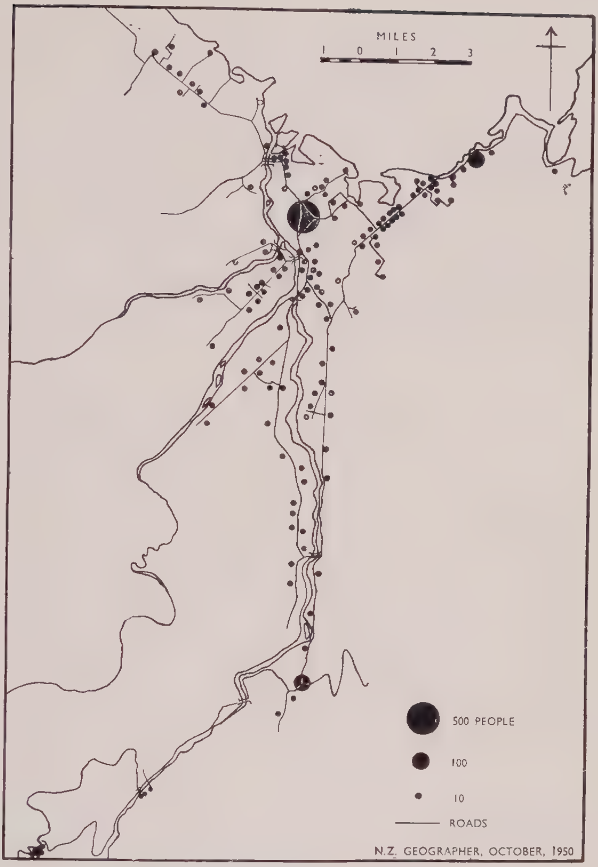

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Fig. 4. Distribution of Population.

The distribution of people in the valley has assumed the characteristic New Zealand pattern of dispersed rural settlement. Only twenty-six Maori remain in the lower valley. Originally settlements were located in isolated clearings in the bush. The early pattern was open and scattered. It remained dispersed with the exploitation of timber for the small, inefficient mills did not cut back the forest systematically, but cleared only small patches of country at a time. Even since 1900 there has been little change in the general plan of distribution. Today houses are built near the roads, and in the more fertile and longer-settled areas something akin to ribbon development has occurred. These areas are concentrated in the northeast; elsewhere settlement is less dense. Two new centres of population have been superimposed on the original pattern during the twentieth century. The first of these groups finds employment in the Tarakohe cement works; the second has resulted from the establishment in the last decade of the Cobb hydroelectric power scheme in the south.

During a century of European occupation the population of the valley has increased steadily. In the intercensal period 1936-1945 there was an increase of nine percent, bringing the total population of the county to 2182. Ninety-four percent of these live in the valley, the remainder in small bayhead settlements to the northeast, or at the site of the Cobb power station. Five-sixths of the population increase came as a direct result of the Cobb development. Elsewhere outside the valley there was an absolute decrease of approximately fifty per-cent, and even in the western parts of the valley itself there was a considerable decline in numbers. However, this was offset by increases in the northeast, and notably on the alluvial flats about Takaka where population grew by a third. Sharing in this growth was the township of Takaka (512), social and business centre of a community excluded from easy contact with outside areas by abrupt and lofty valley walls.

TAKAKA TOWNSHIP

Two miles inland from the tiny port of Waitapu, Takaka occupies a position central in relation to the rest of the valley. Situated on the floodplain of the Takaka River, it is the focus of roads from all parts of the district, and its commercial influence is felt even in the Aorere valley to the northwest. Within the town board area the business section is confined to a half-mile long discontinuous ribbon of buildings on the Richmond-Collingwood state highway about, and to the north of, the junction of that road with the Motupipi road. The street pattern forms a large triangle with sides about a mile in length. Behind the houses which line these streets there is a 'hollow' area devoted to farming, while the town continues to spread along the roads which lead out into the country from each corner of the triangle. A grouping of dwelling houses is evident in areas free from floods.

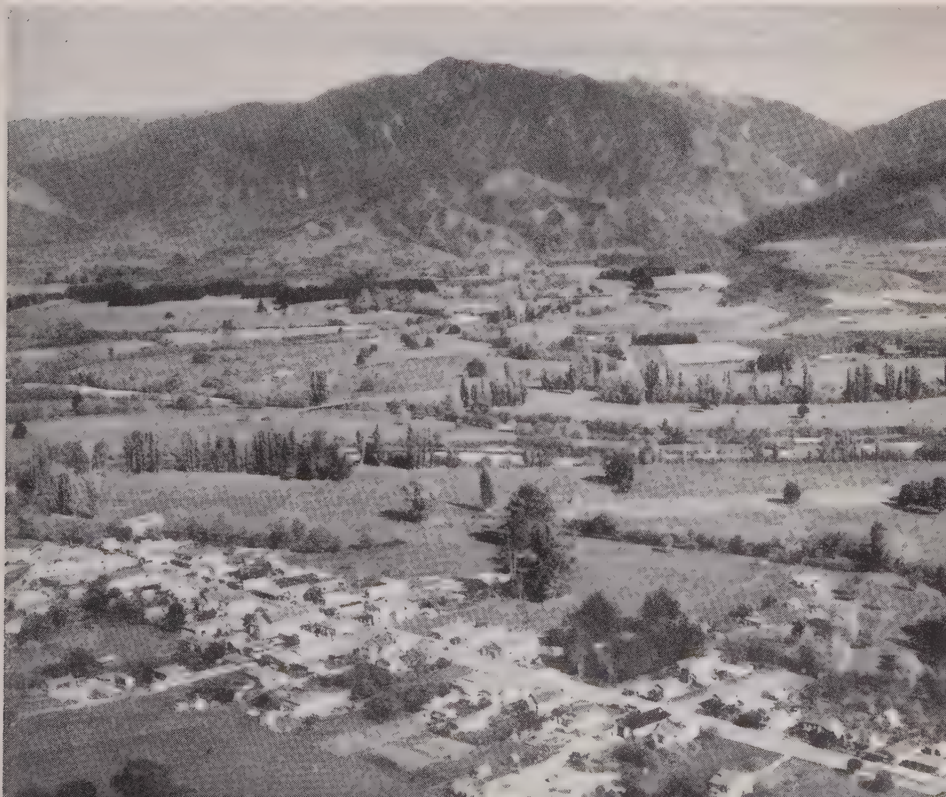
The most important function of the thirty-five business enterprises in Takaka is that of retail commercial distribution. Each of the general stores has its small fleet of vans, and bread and meat are also delivered to all parts of the valley. People from the outlying districts make a point of coming to town on Friday evenings to purchase goods and perhaps attend the cinema. With two doctors and a dentist, two accountants, a bank and a post office the town provides the professional needs of the community. Municipal services largely consist of the upkeep of the tar-sealed roads and footpaths. The adoption of a plan to ensure a more rational layout for the inconveniently sprawling town has met with considerable opposition. Government business is administered from Nelson, which is also the headquarters for several branch firms in the valley, and also for the local education board. Takaka District High School, the principal educational institution in the Golden Bay area, is in the township, three-quarters of a mile north of the business section.

A community sixty miles from the nearest railway and separated from neighbouring centres by a mountain range is more than usually dependent on road transport. This is reflected in the firms, at least six in number, which have replaced the thriving smithies of former days, and rely directly on the automobile for their business. As much concerned with motor transport as any other enterprise in the valley is the dairy factory in the northeastern apex of the street triangle. This cluster of buildings with its tall smoke-stack is probably the most important single unit in the cultural features of the landscape. For here cream, the life-blood of the valley's economy, is processed into butter, the principal export of the area.

The Contemporary Rural Scene

The valley of Takaka stands out as a distinct physiographic unit, an oasis of pasture land in a tumbled desert of mountains covered in scrub and bush. Within this area there are landscapes of differing character, sometimes varying with the nature of the terrain, sometimes with vegetation, land use, or soils. Buildings add little to these variations;

Fig. 5. Alluvial Flats, Takaka Township and Anatoki Valley from the Northeast. *Photo: Whites Aviatio*



throughout the valley, farmsteads consist of five or six buildings scattered in a seemingly haphazard arrangement in the vicinity of the farmhouses.

The cow dominates the economy of the valley. Relatively, sheep and pigs are less important, though highly profitable. Horses have been largely superseded by tractors, and today most of the work on the farms is done either by the large machines of agricultural contractors or by the smaller tractors owned by the farmers themselves. Holdings are fairly small, the average size in the valley probably being less than 200 acres, and there is a considerable number of units smaller than fifty acres. Usually these smaller farms, almost solely concerned with dairying, are worked on a part-time basis. They are concentrated in the northern section of the valley where day work off the farm is most readily available. In this area heavier, damper soils favour dairy farming and fat lamb production. To the south, on the shingle and marble country, the sheep replaces the cow except in more favoured localities. Nevertheless, grass, the single main crop, is supreme in the valley, and is rarely combined with field crops. On grass depend the 6000 cows and 54,000 sheep of the county. Many sheep are pastured on the hills to the east of the valley.

A Typical Dairy Farm

One dairy farm of 150 acres near the township supports about ninety cows as well as breeding and carrying its own herd replacements, normally from a fifth to a quarter of the herd annually. Since 1939 there have been no sheep on the farm, but about a hundred pigs are fattened annually. The only cultivated land is the small garden plot by the homestead. An apple orchard planted during the days of 'subsistence' farming no longer bears commercially. The rest of the farm is under pasture, largely ryegrass and white clover, but with considerable growth of cowgrass, trefoil, cocksfoot and paspalum. Troublesome weeds like docks, rushes and buttercups, common on these riverflats, are cut regularly, while the permanent pasture is kept vigorous by annual topdressing and harrowing. Each year about thirty-five acres are closed for hay which is harvested by mechanised equipment. The average yield is a little under three tons to the acre, or 2500-3000 bales. This is sufficient to carry the cows through the period of minimum grass growth from May to the end of August. This general form of land utilisation varies little throughout the valley, although many dairy farms fatten a few lambs, and sheep replace cows in the south.

Despite the paramount importance of grass, trees make frequent appearance in the landscape. Poor stony land in the south and west is in some parts utilised for pine plantations. Lining the numerous water courses in the valley are dense rows of willows often overtopped by great lombardy and aspen poplars. To the eyes of a farmer from, say, Taranaki the singular dearth of shelter hedges in any part of the area would be striking. Most farm occupiers feel that the climate is such as not to require the planting of shelter. In the south the deep green of the second-growth totaras scattered over the land gives a contrast to the lighter green of the exotic trees. Differing abruptly from the tamed appearance of the rest of the valley, thousands of acres of almost unmodified pakihi remain in the northwest, the drab and stunted terrace vegetation offering a challenge to the skills and ingenuity of the grassland farmer.

The introduction of European vegetation in the valley has resulted in seasonal changes in the landscape. The unbroken forests of 1840 displayed little evident change from season to season. Today the pastures which have ultimately replaced the forest, notably in the southern part of the area, dry out badly in the summer and colour this part of the countryside with varying shades of brown, thus making the landscape more akin to that of Marlborough and Canterbury than would normally be expected in a place where twenty inches of rain fall in the four summer months. Even the heavier lands in the north are severely affected by a rainless period of three weeks during the warm season. Green in the spring and summer, russet and gold in the autumn, the bare boughs of the deciduous trees impart a dreary aspect to the winter landscape which not even the green of the pastures can alleviate.

POWER AND INDUSTRY

The population map of the valley shows two concentrations of people who have no apparent relation to the agricultural productivity of the soil. One group clusters around the cement works in the northeast; the other is the settlement of Cobb valley workers at Upper Takaka in the extreme south.

Cement making began at Tarakohe in 1911. Subsequent enlargement of the plant has allowed for a production of over 50,000 tons annually. The works are situated in a limestone gully about seven miles from the township on the shores of Golden Bay. A tram line leads directly out on to the company's wharf. Lack of shipping and shallow water hamper the export of the cement, and in times of great demand, some is even sent by lorry across 150 miles of difficult country to the South Island railhead at Blenheim. Limestone and silica sand are obtained from nearby quarries, but gypsum and coal must be brought in over the wharf. In the present period of unsatisfied demand the works are kept constantly busy, so that at all times a murky cloud from the smokestacks drifts up the gully, making the atmosphere unpleasant for the few dwellers in the area. Most of the workers however live well away from their place of employment. Numerous small houses perch on the limestone cliffs between Tarakohe and the beach resort of Pohara, and many of the workers own farms in the Motupipi area, in effect combining industry and agriculture in their daily lives.

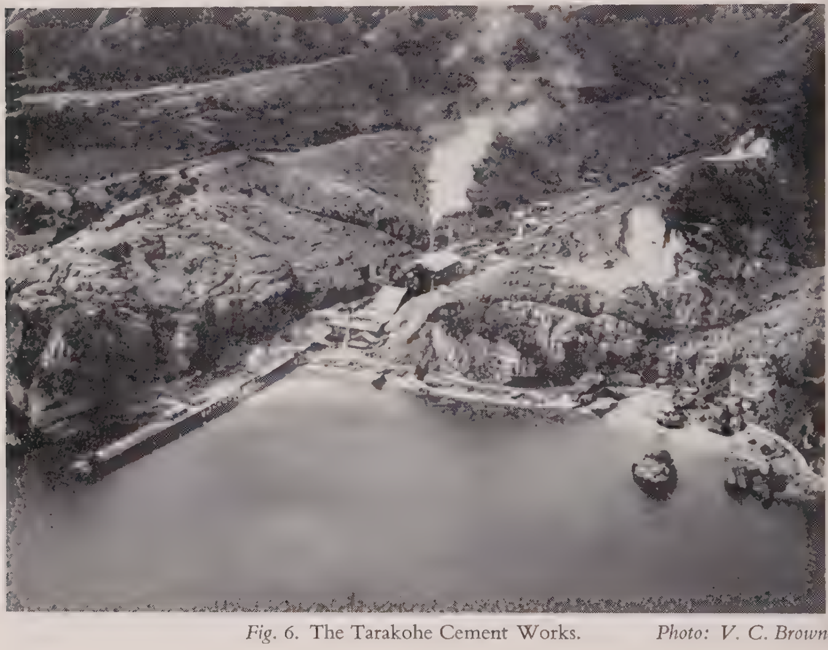


Fig. 6. The Tarakohe Cement Works. *Photo: V. C. Browne*

Hidden in its smoky gully, and with its workers fitting harmoniously into the local pattern of settlement and way of life, the cement mill has little apparent influence on the valley landscape.

The Cobb project is a development of the last decade. Deep in the narrow gorge, cut thousands of feet below the general level of the Douglas Mountains by the Takaka River, the power-house site offers little space for the settlement of workers. Therefore, a public works township has grown some miles away on the flats at Upper Takaka. From here power is 'exported' to the Nelson-Marlborough area, and a branch power line swings northward down the Takaka valley, providing the valley folk with an adequate supply of cheap electricity. The Cobb scheme has helped to swell the population of the county, has given the township an enlarged market, and has probably exercised considerable influence towards the improvement of the access road over the Takaka Hill.

Past, Present and Future

During the century of European occupation there have been many changes in the valley. As the settlers spread inland to search for gold and to carve out homes for themselves the forest gradually yielded to the axe. This process was hastened during the period after 1860 when the noise of sawmills echoed up and down the valley and bullock-drawn timber waggons creaked slowly down the unformed roads to the anchorage at Waitapu. But inevitably the mills were forced to close, and it is fortunate that by 1895 another 'cash crop' had been developed to replace the exhausted forests. For fifty years grassland farming has been extended and intensified in an area fitted to this type of land utilisation both by an ideal climate and by the original subdivision into small farms. The sound of the miner's pick and the scream of the timber saws have been replaced by the bleating of sheep and the lowing of cows, and by the rythmic pulsation of numerous milking machines.

Today an excellent system of roads, centred on the growing township, connects all parts of the valley. Exotic trees scattered over the valley floor lend an English flavour to the landscape. Every home and farm is served by electricity, and farm work is made less arduous by the use of mechanised equipment wherever possible. The valley is the home of a small, isolated, but thriving, community.

It would seem that as long as there is a market for New Zealand primary produce the prosperity of the valley is assured. Although potential farming land is strictly limited by the steep and abrupt valley walls, there is yet room for considerable expansion on to the thousands of acres of pakihi country in the northwest, if only a cheap method of promoting pasture growth in the impoverished soil can be developed. Already the fringes of these sterile lands have been made productive, but only after great expenditure in time, labour and fertiliser. Possibly the use of heavy machinery may be the answer to the problem. Intensification of land use by pasture and herd improvements should also yield greater returns. In no part of New Zealand have all the lessons of scientific farming been learned and applied.

The production of cement and the generation of hydroelectricity appear to hold an assured position in the future, for as yet there is in New Zealand a great unsatisfied demand for these commodities. It is still remotely possible that iron and steel may be manufactured from the deposits at Onekaka, only nine miles northwest of the township. But a community based essentially on the land will continue to look to the soil for its wealth. Even in the future, Takaka can scarcely hope to be more than a small unit on the remote fringe of the South Island commercial hinterland of Wellington.

THE DEVELOPMENT OF OMMUNICATION LINES ACROSS THE TARANAKI UPLANDS*

W. B. JOHNSTON

SINCE MAN first set foot in New Zealand physical barriers have hindered the development of both communications and ettlement. The Maori were confronted with the difficulties of land ravel between tribal centres, whilst the establishment of the first European settlements and their maintenance for many years was possible only with the aid of sea communications. In the North sland, as settlers occupied the more accessible lowlands, the Maori ribes were forced to move into the surrounding pockets of rugged country. Thus, to the Europeans, land communication became a problem of a dual character. Not only was there the rigorous nature of the intervening physical barriers but also the antagonism of the Maori occupants who refused to surrender to an alien civilisation.

Long before the middle of the nineteenth century the work of inland exploration had begun. The nature of the country in both the North and South Islands demanded that exploration be carried on from many unconnected bases, and consequently the epic of exploration forms o single coherent story but a complex episodic chronicle. European ettlements developed in virtual isolation from each other apart rom irregular sea connections. The removal of this isolation has een directly related to the development of modern communication ines which have provided land links of easy traverse between centres f growing population and increasing production. Yet in spite of he present national network of roads and railways a legacy of the ast has persisted, and is expressed in the distinct regional consciousness o characteristic of present-day New Zealand.

One of the earliest European settlements in New Zealand was that f the Wakefield colony of New Plymouth, founded on the north-est coastal margin of the lowlands of Taranaki. The lowlands,

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n this article the Taranaki Uplands have been considered as the broken hill country which s mainly within the Taranaki Province west of a line through Te Kuiti, Taumarunui, Taihape d Wanganui, and east of Urenui-Patea. Alternative names for part or all of the area are: aranaki Backcountry, Western Uplands and Taranaki-Wanganui Hinterland.

encircling the isolated volcanic peak of Mount Egmont, are enclosed landwards by a wide arc of low but extremely rugged hills, the Taranaki Uplands. The most persistent effect of this physical barrier was the long period of land isolation of New Plymouth from the Waikato basin and Auckland.

TARANAKI SETTLEMENTS

The settlement of New Plymouth, or Taranaki, was founded in 1841 on the coast two miles east of Moturoa. From this point to the mouth of the Waitara River there is a narrow coastal plain extending half a mile inland to the ancient sea cliffs which mark the edge of the lowlands of Taranaki. The lowlands form an arc averaging ten miles in width and extend for fifty miles around the eastern base of Mount Egmont. They rise from one hundred feet near the northern coast to over one thousand feet at Stratford whence they descend to the sea near Hawera. The original settlement was confined to the coastal plain covered in scrub and fern, and no attempt was made to penetrate the dense subtropical rainforest which clothed the lowlands.

After the arrival of the initial settlers the colony languished for a period. The open nature of the roadstead was responsible for high costs in the transhipment of goods and was important in retarding land settlement. The only area on which the early immigrants could be immediately settled was the Waitara block which, covered with a scrub vegetation, required less effort to clear and cultivate. Communication between the Waitara block and New Plymouth was primarily by sea but the bar at the mouth of the Waitara River restricted entrance to vessels of small tonnage, whilst travellers by land encountered difficulties in crossing the numerous streams.

In 1851 the New Zealand Company ceased to function and the various settlements including Taranaki were sold to the Crown. Progress was stimulated with the removal of the company's restrictions on land development. However the next ten years witnessed a deterioration in the relations between Europeans and Maori; conflict over land ownership led to open warfare in 1860, and for a decade the settler had to take up a rifle and lay down the axe. Land development was arrested. Years of work were rendered useless. The 'peace policy' of Sir Donald Maclean was accompanied by more amicable relations and between 1872 and 1874 an area of 379,470 acres of land for settlement was purchased by the Provincial Council.[1]

The development of rail and coach connection between Wanganui and New Plymouth during the 1870's was accompanied by an extension of settlement over the forested lowlands along the line of communication. It was during these years that town sites such as Inglewood were surveyed and settled. The immediate isolation of New Plymouth from outside centres was thereby removed. In addition, construction was begun in the 1880's on the concrete breakwater which was to replace the open roadstead.

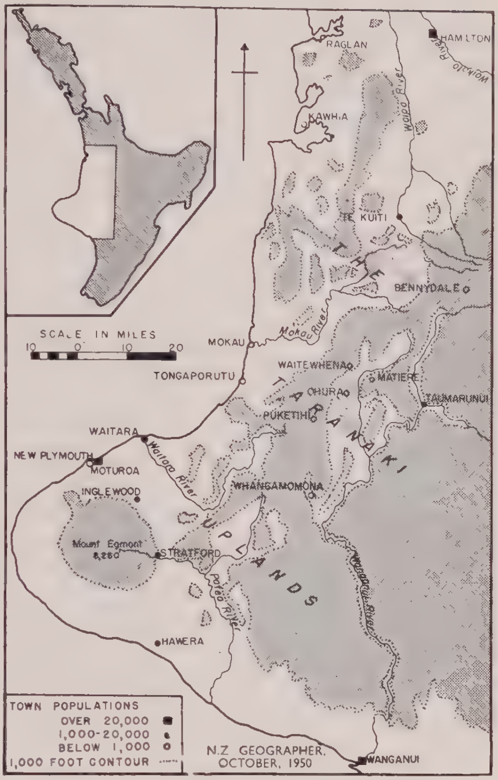

Fig. 1. Location Map.

With the successful advent of refrigeration in 1882, farming in countries like Australia and New Zealand, distant from the world markets, was transformed. Taranaki was the first part of New Zealand to show a spectacular advance as a result of refrigeration. Extensive areas of native forest on the lowlands were milled or burnt and converted into pastures of English grasses; dairy produce destined for Britain replaced the fungus trade with China as the mainstay of the economy of the province. New roads were constructed and old ones improved; rivers were bridged. It was during these years of economic prosperity that most of the lowlands of Taranaki were occupied. Pioneers now began to probe the borders of the uplands.

WAIKATO SETTLEMENT

From Auckland settlement spread southwards through the Waikato basin, encouraged by the construction of the northern sections of the Main Trunk railway. The railway construction boom which followed the inauguration of Vogel's policy of assisted immigration and energetic construction of public works provided the impetus under which the line was carried to the King Country, and by 1883 the railhead had reached Te Awamutu on the northern border.

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[1] W. H. Seffern: *Taranaki*, New Plymouth, 1896, p. 204.

The northern boundary of the King Country was the *aukati* beyond which the European settler was forbidden to trespass. The frontier for white settlement lay along the confiscation line as defined in 1864.[2] The area southwards to the Taranaki Confiscation Line became known as the King Country—the domain of the Maori king—which remained closed to the white man until the general amnesty of 1883 and the lifting of the *aukati* in 1885. By 1887 the railway had reached Te Kuiti.

Te Kuiti is situated at the head of the Waipa basin, which presented few physical difficulties to the railway engineers. Te Kuiti however marks the limit of the lowlands. Here begins the broken country of the Taranaki Uplands which extend for over seventy miles to Urenui at the northern limit of the lowlands of Taranaki. In 1885 the Wellington-New Plymouth railway was completed and reliable means of communication established. Te Kuiti was in a comparable position in relation to Auckland, but separating Te Kuiti and New Plymouth was the formidable barrier of the Taranaki Uplands.

THE BARRIER OF THE UPLANDS

The Taranaki Uplands are of relatively low altitude but the dendritic drainage pattern and the broken nature of the surface configuration give a rugged appearance to the area. A maximum elevation of 3000 feet is attained about fifty miles inland where the uplands merge into the volcanic plateau in the interior of the island. Terrace remnants at various elevations are also evident, the hundred-foot terrace being remarkably complete and of special importance from the point of view of communication lines.[3]

Well-graded for many miles inland, the incised rivers meander through the maturely dissected plateau. The steep symmetrical ridges which separate the narrow valleys rise 400 to 1000 feet above the valley floors, and average slopes are steep, frequently of the order of twenty-five to thirty degrees. In combination these features made travel on foot exceedingly slow and laborious, but were accentuated even further as barriers by the character of the vegetation. Before the advent of European settlement, the Taranaki Province was almost entirely clothed in a mixed evergreen subtropical rainforest in which tawa (*Beilschmiedia tawa*) was dominant.[4]

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[2] The line ran approximately from Aotea Harbour through the summit of Pirongia to the junction of the Puniu and Waipa Rivers, and thence along the Puniu River to its source.

[3] For a systematic description of the physiography see L. I. Grange: 'Geology of the Tongaporutu-Ohura Subdivision', *N.Z. Geol. Survey Bull. No. 31*, Wellington, 1927, and M. Ongley and J. Henderson: 'Geology of the Mokau Subdivision', *N.Z. Geol. Survey Bull. No. 24*, Wellington, 1923.

First Impressions

The early settlers and explorers who ventured into the uplands returned with unfavourable impressions. Their mere extent was an obstacle. Tracks were few and to follow a river valley meant an extremely circuitous journey, for the traveller was obliged to climb from one river valley into another over a succession of steep ridges. Dense forest hindered progress, and where tracks did exist they were frequently little more than canals of slush. The long periods of warm frontal rain gave no respite. Rivers flooded rapidly and the narrow gutter-like valleys became swollen torrents. Mist enveloped the valleys at night and in winter often persisted until midday. The noise of mass movements of acres of hillsides after heavy rain sounded like thunder. During the summer, placid streams meandering peacefully through luxuriant forest belied the true character. Yet even at this season, during short periods of heavy rainfall, the countryside was as inhospitable as in winter. Slush and slips, inescapable forest, floods and fogs, innumerable razorback ridges, and rivers formed a characteristic and

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[4] For a description of the vegetation of the Taranaki Uplands see E. B. Levy: 'The Taranaki Backcountry', *N.Z. Journ. of Agric.*, Vol. 27, 1923, pp. 138–156.

Fig. 2. The Lowlands and Uplands of Taranaki dominated by Mount Egmont.

Photo: V. C. Brow

repeating pattern. Yet, paradoxically, the pioneers never ceased to be attracted to the uplands, attracted because here was a battle-ground where conflict between man and nature was always to the fore.

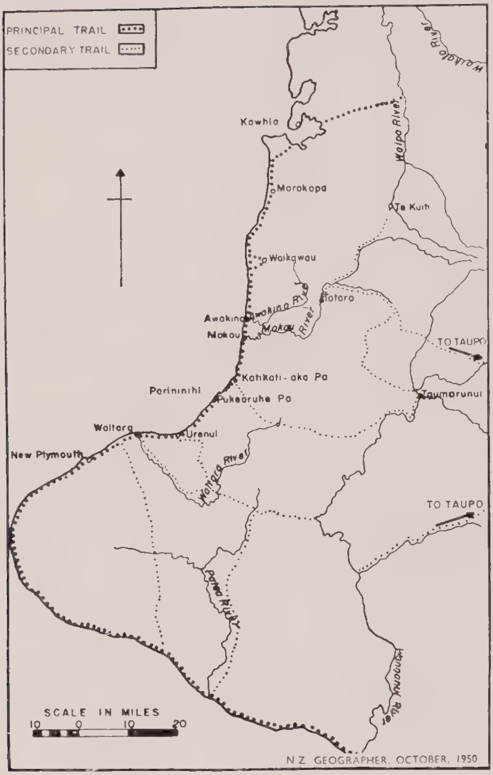
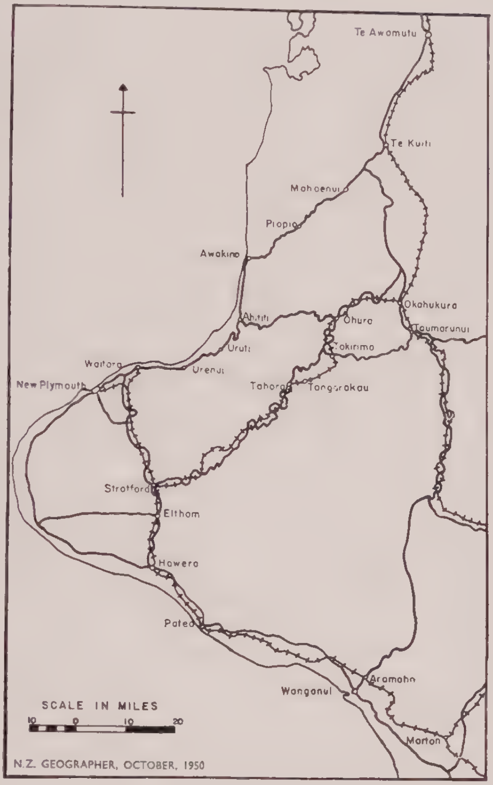


Fig. 3. Maori Trails.

The earliest land communications between the upper Waipa basin and the lowlands of Taranaki were those developed by the Maori (*Fig.* 3). During their frequent incursions against the Taranaki Maori, the Waikato tribes used as a war trail the principal route which followed the coast from Kawhia to New Plymouth, whence it continued south to Cook Strait. Advantage was taken of every stretch of beach that existed but in the more thickly-populated parts it ran inland from pa to pa or from village to village but, because of the physical nature of the country, never very far from the coast.

From Kawhia to Waitara

The area between Kawhia Harbour and the Mokau River was apparently never very thickly inhabited although there were several well-known pa and settlements, notably at Marokopa, Waikawau and along the Awakino River. Several branches of the Ngati Maniapoto tribe lived near the mouth of the Mokau and along the valley. From the Mokau to the Katikati-aka pa at the northern end of the White Cliffs (Parininihi) the trail traversed the hundred-foot coastal terrace. This open stretch of land possesses a fertile soil and at one time must have been intensely cultivated by the Maori to support the large population that dwelt in the numerous hill forts still to be seen. From the Katikati-aka pa the trail descended abruptly to the beach whence it proceeded southwards for three miles along the narrow stretch of sandy beach which was uncovered at low tide. Immediately the cliffs were passed the trail wound up the slopes of the Pukearuhe Plateau to the pa strategically situated at this important communication point. South of the White Cliffs commences the undulating country which to-day comprises the rich dairying lands of Taranaki. Broken ranges of no great height rise in the east. The undulating country gradually increases in width southwards from Pukearuhe until at Waitara it is four or five miles wide.



N.Z. GEOGRAPHER, OCTOBER, 1950

Fig. 4. Present-day Communication Pattern.

The Maori confined their activities to the low fern-covered plain. The inland forested ranges constituted a barrier which was penetrated only in search of food but never permanently settled. Likewise it was an effective barrier against incursions by hostile tribes. A few Maori trails led through the uplands and connected scattered villages with the populated coast but movement of goods over long distances, except those of a high value, played little part in the Maori economy of Taranaki.

PAKEHA FOLLOWS MAORI

The potential value of the Maori trails for European use was pointed out and suggested as early as 1869.[5] Along the lines of the trails many secondary roads have been laid whilst the route of the main coast road between Te Kuiti and New Plymouth corresponds closely with the main Maori trail from north to south. Above all these trails proved indispensable to early surveyors and explorers.

See J. Cowan: *Sir Donald Maclean,* Wellington, 1940, especially pp. 105-108.

In the early years of settlement in Taranaki sea communications were all-important, but with the development of the easy land route along the coast of the South Taranaki Bight the sea links with Wellington became less significant. Cobb's coach provided the first regular road connection between Wanganui and New Plymouth early in 1871, and thereafter sea traffic between New Plymouth and the south diminished. The opening of the Wellington-New Plymouth railway in 1885 completed the diversion of trade from sea to land. In contrast sea trade with Auckland increased because New Plymouth became the transhipment centre for the through rail-sea route of the North Island. The river port of Waitara commanded a considerable share of both inward and outward shipping. Regular services were in operation to Onehunga, Raglan and Kawhia, while Mokau and Awakino were largely supplied by sea. During the last decade of the nineteenth century the construction of the artificial harbour at New Plymouth concentrated sea traffic through that port to the detriment of Waitara.

The year 1890 marked the peak period of the coastal sea service. The completion of the Main Trunk railway in 1908 led to a rapid decline in the coastal trade. The clearance and maintenance of a channel through the bar at the entrance to the Manukau Harbour was too great a task to be economical. However lack of other means of transport necessitated the continuance of the sea service from New Plymouth to the North Taranaki coastal settlements, but despite its fundamental role in the early progress of Taranaki it could not compete with the rapid and reliable services which the rail and road were to provide.

Completion of the Main Trunk Railway

The years between 1890 and the opening of the Main Trunk railway were those of transition in means of transport; coastal sea communication reached the maximum development and began to decline; the survey of land routes across the Taranaki Uplands was inaugurated; and a beginning was made on the construction of the coastal road and the inland road and railway. The principal feature of the period was the completion of the Te Kuiti to Marton section of the Main Trunk railway.

Te Kuiti is 120 miles in a direct line from Marton across the eastern Taranaki Uplands. The question of alternative routes was raised again and again as each important section was nearing completion. One possibility was to head westward to the growing settlement of New Plymouth and thus utilise the railway already constructed between New Plymouth and Wellington. The present route was adopted with the belief that it would give access to the greatest area of land suitable for settlement and followed the least costly line across the interior of the North Island.

The railway was the key factor in the opening up and development of the King Country. Thousands of acres were made accessible for pastoral settlement; timber milling and allied industries became the main feature of the King Country economy. Settlement in the Ohura district was pioneered during these years but progress was handicapped by the twenty miles of unmetalled road which separated it from the railway.

The diversion of through North Island traffic to the Main Trunk railway brought a decline in the entrepot trade of the port of New Plymouth. The bypassing of Taranaki by the railway reemphasised its isolation, especially from the northern settlements. Farmers along the North Taranaki coast and in inland Whangamomona, despite twenty years of settlement, were still isolated for more than six months of the year, whereas the new settlements in the King Country possessed from the time of their foundation a railway direct to an overseas port. This situation more than anything else stressed the necessity of providing isolated settlements with an uninterrupted means of access to New Plymouth. Commercial interests reinforced popular opinion in the desire for good transport services not only to develop existing settled areas but also to bring new areas into the orbit of the port of New Plymouth. The opening of the port of New Plymouth in 1917 for direct overseas shipping accentuated the validity of the case.

The Stratford-Okahukura Railway

The first sod was turned in 1901 on the Taranaki connection with the Main Trunk railway, and by 1911 the line was operating for a distance of thirty-five miles from Stratford to the foot of the Whangamomona saddle where a long tunnel was incomplete. As a result of agitation by Auckland commercial interests and by farmers at Ohura and Matiere, construction was begun at Okahukura in 1911. Progress at both ends was fitful. Scarcity of labour during the war of 1914-1918 combined with varying economic conditions to retard construc-

Fig. 5. Pioneer Farming in the Uplands. *Photo: Turnbull Library*

tion, but neither these factors nor the engineering difficulties presented by the physical character of the area were totally responsible for the long delays and slow rate of progress. Construction was retarded or accelerated by political whims. By 1922 the ten miles between Matiere and Okahukura were completed and Whangamomona was connected with Stratford.

The years immediately after 1918 were characterised by a further increase in the number of settlers in the Taranaki Uplands. Men with limited practical experience in the farming problems of the uplands acquired large holdings. Thousands of acres were often taken up in one holding; extensive areas of forest were burnt off the hills; and surface-sown grasses became a common sight among charred tree stumps. The year 1924 can be claimed to mark the end of the futile rush to obtain farms from which, it was commonly believed, fortunes could be made in a short time. Disaster followed disillusionment. The haphazard farming methods resulted in the rapid reversion of hill-slopes to second growth. Fertility declined until the high quality English grasses disappeared and poorer grasses such as danthonia and browntop became dominant. Because of extensive slipping, many farmers found it impossible to maintain a continuous grass sward on the hills; large areas of manuka became increasingly common and reflected the declining fertility. The culmination of this period of illogical and wasteful land settlement was the abandonment of thousands of acres to the encroaching scrub and second growth. In short, settlers had failed to take into account the limitations imposed by the nature of the surface configuration and by the peculiarities of climate and geological structure.[6] A saner policy of land development followed and attempted to check reversion to scrub and to stabilise the soil by resowing, subdivision and topdressing.[7] Railway facilities were an important means of implementing the policy, for by 1926 rail cartage was possible from Stratford to Tahora and from Okahukura to Ohura. Although the rail link was not complete, settlers were no longer in a state of isolation.

With the completion of the railway in 1932 inland districts gained ready access to the seaboard at New Plymouth. Overseas port facilities were brought seventy to eighty miles nearer to Ohura and Matiere. Reduced haulage costs, access to profitable markets, the prevention of loss of condition by trucking stock instead of droving, the reduced distance to freezing works and dairy produce grading stores, shorter routes for the railage of wool for disposal or shipment; all these factors effected substantial savings for the primary producer.

Wider Taranaki Contacts

The completion of the Main Trunk railway had forced Taranaki into a communications backwater, but after 1932 the balance began to swing back. With the decrease in rail distance and the shorter travel time, Taranaki assumed importance as a perishable goods market for Auckland products such as fish, fruit and early vegetables. Competition in manufactured goods was stimulated. Better facilities became available for transporting Waikato coal into Taranaki. The low-grade coal deposits of the upper Mokau and Tangarakau area were developed. The coal mines of Bennydale and Puketihi, and the opencast workings at Waitewhena now rail large quantities of steam coal to Taranaki dairy factories and to the freezing works at Waitara and Patea, and timber companies have gained direct rail access to their principal forest resources in the central and southern parts of the King Country.

The need for this railway has been severely questioned during the last few years because it has not yielded revenue in proportion to the high capital cost of more than three million pounds for the eighty-nine miles of railway. When the line was begun in 1901 no one denied this need[8] but the slow rate of construction delayed its completion until after the automobile had begun seriously to challenge the railway as a means of transport. By 1932 the prime need for the railway had disappeared. The coastal road had become the principal route across the Taranaki Uplands, providing services of greater economy, especially in time. To justify the position of an uneconomic railway the Railways Board in 1932 stated that 'the railway is to be regarded as the means of transport for the district to the exclusion of competitive services.' Thus the roads of inland Taranaki were not improved on a par with the coastal highway. The progress of the southern King Country and northeast Taranaki was once again retarded through the lack of modern communications. Only since 1945 has the problem of all-weather road access been seriously considered.

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[6] See the investigation and report by a special committee: 'The Deterioration of Crown Lands in Mid-West Districts of the North Island', *N.Z. Journ. of Agric.*, Vol. 31, 1925, pp. 36-51.

[7] For a comprehensive survey of farming around Whangamomona see a series of articles by E. B. Levy entitled 'The Grasslands of New Zealand', in *N.Z. Journ. of Agric.*, Vols. 27-44, 1923-1932.

The Coastal Road

The development of the road pattern across the Taranaki Uplands is related to both the history and the physical character of the area. The coastal road follows closely the principal Maori trail linking Taranaki and the Waikato. The development of the road into the major communication line which effectively removed the isolation of New Plymouth from the north dates from 1918. The advent of the internal combustion engine was the prime influence behind the need for an all-weather route. The New Plymouth to Uruti section was metalled before 1900, but it was not until a decade after the 1914-1918 war that a completely metalled surface existed between Te Kuiti and New Plymouth and the road could be used in winter and summer. At long last the tumbled hill country was no longer a complete barrier, but several major problems had to be overcome before the outlet became an effective communication line. These difficulties had much in common with those that the engineers experienced in the construction of the railway.

The bridging of the numerous rivers draining into the North Taranaki Bight presented important engineering difficulties before the introduction of modern methods of road construction. Deeply incised between steep banks, the rivers presented problems which man accentuated by indiscriminate felling of the forest within the catchments, for the hazard of floods was thereby increased. Moreover the route was forced close to the coast by the bordering hills. This meant that rivers had to be crossed at the widest points at the tidal estuaries. Originally punts were used to ferry man and horse, in the early days, and later, the motor car. Naturally this means of crossing rivers was often dangerous, especially during winter. Disasters were common and fatalities not infrequent. It was a deterrent to travel of considerable consequence. The bridging of the Mokau River was one of the final construction works undertaken, and with its completion in 1927 the popularity of the route was greatly increased.

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[8] See 'Report on North Island Main Trunk Railway', *Appendices to Journals House of Representatives* (D-1), 1899, Appendix F, pp. 105-117.

DEARTH OF ROAD METAL

Another important feature of the physical character of the route is the absence of extensive supplies of suitable roading materials. The region as a whole is singularly deficient in road and railway building materials. The blue-greyish, consolidated mudstone, locally known as ‘papa’, covers nearly the entire area. Only in locally restricted areas are suitable materials available—limestone between Te Kuiti and Awakino and andesitic lavas between New Plymouth and Urenui. Dearth of road metal was a contributory factor in the slow development of an all-weather outlet to the north, for papa-surfaced roads cut up rapidly in wet weather and became treacherous quagmires which compacted into a series of deep wheel-tracks during summer.

From the outset the road between Uruti and Tongaporutu was the critical section. At Uruti the road engineers were confronted with the physical barrier of the Messenger Range which ends abruptly at the coast in the high and steep White Cliffs. The barrier had to be crossed; it could not be circumvented. The road, following the line of an old bridle path, is hewn out of the steep hillside and winds up and over the lowest saddle in the range at an elevation of 610 feet. For many years summer travel only was possible, but by 1928 the oad had been tar-sealed.

The coastal road formed the first northern outlet across the Taranaki Uplands. In 1911 the journey by mail coach between Waitara and Urenui, a distance of nine and a half miles, occupied two hours and no definite schedule could be affixed to the service. However, by 1928, egular and comfortable services by modern means were in operation o Te Kuiti and thence to Auckland. The coastal shipping service ound itself unable to compete with the superior facilities offered by modern land transport and was discontinued after 1930.

The value of the coastal road lay not only in the removal of Taranaki's isolation from northern New Zealand, but also in the completion of an all-weather road between Auckland and Wellington, a route which assumed increasing significance as the volume of motor traffic between the two principal cities of the North Island expanded. New Plymouth regained the position it had lost in 1908 as a strategic centre in the North Island traffic stream.

In March 1949 this Auckland-Wellington highway through New Plymouth was officially opened as the first completely tar-sealed road between the two centres. A critical section remains between Mahoenui and Piopio. Here the road follows a narrow winding route across a series of parallel drainage divides. In 1948 and again in May 1949 serious slips blocked this portion of the road, effectively reminding Taranaki of the tenuous nature of the link that exists with the Waikato and Auckland. Moreover the area forms the transition zone between districts which have a direct community of interest with New Plymouth and those which are dependent on Hamilton and ultimately Auckland. Mahoenui at the southern end of the section is served from New Plymouth, Piopio from Auckland. The difficult country and the difficult stretch of man-made road between these two points make it uneconomic for New Plymouth commercial interests to expand beyond Mahoenui.

THE INLAND ROAD

The inland road follows closely the route of the Stratford-Okahukura railway. The main deviation is between Tahora and Ohura where the road follows the Tangarakau River which has carved a narrow gorge through the Tangarakau Range. The route was surveyed between 1898 and 1900 but it was not until 1940 that the road was completely metalled.

The inland road performs two main functions today. Firstly, it is used as a means of transporting a small proportion of the low-grade coal mined in the uplands to markets within the lowlands of Taranaki. A very small volume of traffic is involved, and indeed local traffic over the inland road, especially between Ohura and Stratford, is insufficient to justify the maintenance costs. The Whangamomona County Council has found itself financially incapable of keeping its portion of the road in reasonable order. This is because the county lies wholly within the uplands. Farms are marginal or submarginal with a low schedule

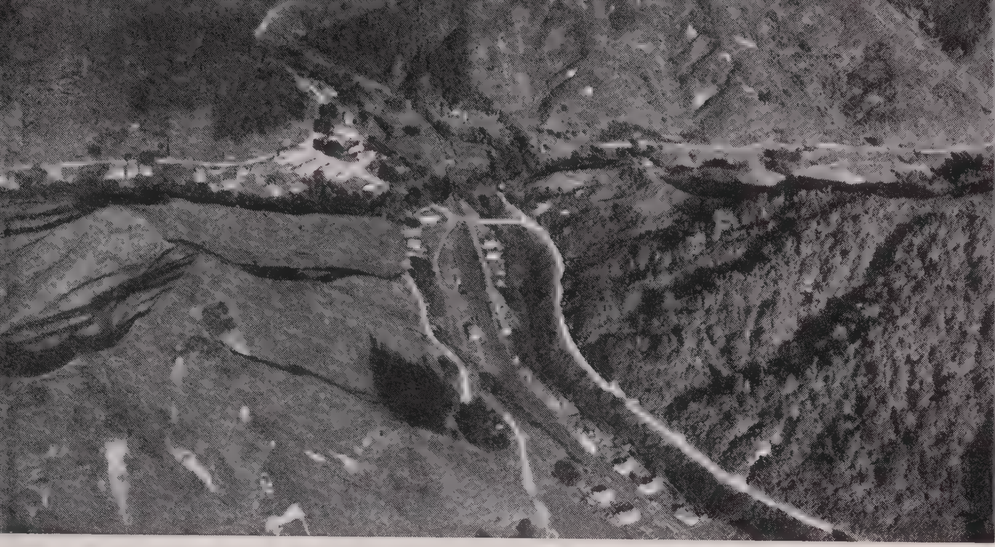

Fig. 6. Inland Routes of Taranaki: Road and Railway at Whangamomona. *Photo: V. C. Browne*

of rates. The income of the council is small and the state has been obliged to undertake the maintenance work.

The main value of the road lies with the second function, that of tourist traffic. Impressive scenery attracts the tourist. Virgin forest unmauled by man contrasts with the slip-scarred and burnt-over areas which have resulted from his disastrous attempts to farm the land.

Any importance that the inland road may claim derives from these two functions. The route has never been an important means of servicing inland Taranaki or the southern King Country and represents a masterpiece of bad planning combined with the complete disregard of the physical nature of the area. The Tangarakau gorge s normally closed by slips during the winter so that the potential value of the road is limited to that of summer tourist traffic.

AHITITI-OHURA-TAUMARUNUI ROAD

The development in recent years of a new all-weather road access o the Ohura, Matiere and Taumarunui areas has captured any trade from these districts that went over the inland road. The demands of modern automobile transport necessitated an all-weather road between northeast Taranaki and the southern King Country and New Plymouth if the area was destined to look to New Plymouth as the ommercial centre and overseas port. The railway had developed a degree of community of interest but Auckland maintained strong ommercial influences within the area. The opening of the road s an all-weather communication line in 1945, and subsequent improvements, have aided the closer binding of northeast Taranaki in particular with its centre of New Plymouth. Continued improvement will help to extend further the hinterland into areas which will have greater economic incentives to trade with New Plymouth. The first step in the fulfilment of this desire was accomplished in April 1949 when the Ahititi-Ohura road, together with its extension via Tokirima to Taumarunui, was declared a state highway.

Present Pattern of Communications

The focal point of the present pattern of communications is the progressive city of New Plymouth (*Fig.* 4). The artificial harbour has been an influential factor in this development, especially since 1917 when it became capable of berthing overseas vessels. Taranaki's economy, in common with that of the remainder of New Zealand, is dependent on overseas markets for the disposal of its primary products. The fact that New Plymouth can provide direct overseas shipping services is significant in itself. An additional influence is the unique position of New Plymouth as the only overseas port on the west coast of the North Island. Moreover it is midway between Auckland and Wellington, the two major overseas ports of the North Island. Consequently New Plymouth would appear to be well situated to encompass a wide area within its commercial and economic orbit. The fulfilment of this potentiality has been hindered by the nature of the surface configuration of Taranaki.

But today the uplands no longer isolate New Plymouth. The communication pattern provides an extensive area with means of trading advantageously with New Plymouth as compared with Auckland and Wellington. The communication lines radiating from New Plymouth reach across the upland belt to connect with the main through routes which traverse the interior of the North Island.

Communications and Settlement

At first the railway construction rigidly determined the pattern of inland settlement and the growth of towns remote from the port of New Plymouth. In recent years the main highway and motor transport have changed the emphasis. Smaller towns removed from the port and off the railway have now a readier access and can be expected to flourish relative to their earlier stagnation because of isolation. Seaside resorts, especially beach camps at Urenui, Waitara and New Plymouth, and the Egmont mountain resorts have already begun to show, by increased numbers of holiday makers, the beneficial effects of road transport. In addition it has everywhere blurred the sharp rigidity of the earlier pattern of settlement and has occasioned the outward sprawl of many towns, notably New Plymouth. The situation of Patea and Waitara, near the border of the uplands, on transport routes has contributed to their growth. Similarly Stratford's progress has been aided by its site as a road and railway junction. Above all, Te Kuiti, the important communications centre on the northern border of the uplands, experienced an intercensal increase in population of 8.84 percent. Conversely the recent stagnation in population growth and decline in importance of some centres can be largely attributed to the effects of motor transport. The diminishing importance of Eltham as a staging point is due to the popular use of the motor car.[9]

The prime requirements for progress within the populated areas of the uplands are more roads and better roads. Thomas Kelly admirably summarised the situation. 'A distinguished and successful General was asked what were, in his opinion, the three most essential requirements of an army; he replied, "Boots! boots! boots!" If I were asked what are the three first requisites for the successful settlement of these rich forest lands, I would answer, "Roads! roads! roads!" '[10] These words were written in 1892 but they ring equally true today.

The Expanding Hinterland of New Plymouth

New Plymouth[11] in common with a great number of cities depends rimarily for its existence on the commercial function. It is favoured y having no near neighbour; no city to drain away its trade, no rival to easure strides with, as for example Napier and Hastings. As a port, can develop its backcountry and still remain a well-balanced city. has not become a Lyttelton to a Christchurch. Neither is it the verspill of a large city as is Lower Hutt. The 1936–1945 intercensal rowth of 11.44 percent is a reflection of New Plymouth's favourable tuation in relation to its productive hinterland.

All population statistics are from the Population Census, 1945, Vol. I, Census and Statistics Dept., Wellington. The intercensal increase for Te Kuiti was from 2499 in 1936 to 2720 in 1945. Eltham showed an intercensal decrease of 2.32 percent; from 1899 in 1936 to 1855 in 1945.

T. Kelly: *Narrative of a Journey through the Upper Waitara Valley and across the Tangarakau Country to the Wanganui River*, New Plymouth, 1892, p.2.

Gazetted as a city on 27 January 1949 on attaining a population of 20,000.

The expansion of the hinterland between 1841 and the opening of the Main Trunk railway in 1908 was associated with the growth of settlement on the lowlands of Taranaki. The early construction of the main south road and railway resulted in the coastal overlapping of the tributary regions of Wanganui and New Plymouth, the boundaries of which have remained remarkably static. The coastal settlements of northern Taranaki—Awakino, Mokau and Tongaporutu—were serviced by coastal vessels from the river port of Waitara and later, with the construction of the artificial harbour, from New Plymouth. It was not until towards the end of the century that settlement expanded into the forested uplands.

Former Dominance of Wanganui

The years from 1908 to the completion of the Taranaki link with the Main Trunk railway in 1932 formed the most important period in the extension of the hinterland of New Plymouth. Settlers moved inland from the railway to Ohura and Matiere; from Stratford the Whangamomona area was settled. These potentially valuable districts were closer to New Plymouth than to Auckland or Wellington but the absence of communication lines across the physical barrier proved advantageous to the latter centres. For many years water traffic along the Wanganui River and its tributaries was of considerable importance in servicing the central and southern King Country and within the area there still remains a degree of the earlier commercial dominance of Wanganui. Part of the present commercial structure of the King Country is built upon the wool supplies which move outwards, via road and rail, to the wool stores at Wanganui, and thence by coastal vessels to Wellington.

The opening of the Main Trunk railway naturally tended to make the ever-growing population look towards Auckland. The dominance of Auckland's influence remained until the completion of the Stratford-Okahukura railway in 1932 and the broad imprint remains today. With the improvement of roads since 1932 the principal development has been a closer tying of these areas with New Plymouth. The present era is essentially one of consolidation. No wide expansion similar to that which occurred between 1908 and 1932 can be envisaged in the immediate future. The one area in which recession of Auckland's sphere of influence and New Plymouth's advance is possible to any great extent is towards Taumarunui and the Taupo district. The eastern portion of the area is at present within the pioneer fringe of the Volcanic Plateau.

Conclusion

The uplands still remain a problem area for communications[12] though to a lesser degree than before. The growth of New Plymouth was dependent upon the development of communication lines across the Taranaki Uplands. Conflict with the commercial interests of other North Island centres, especially those of Auckland and Wanganui, was unavoidable. The improvement of the communication lines has been accompanied by the development of the rural region which has a direct community of interest with New Plymouth, and as the regional economy took form and expanded so the town grew in response to the needs of the rural region it serves. The interests of town and country are identical. New Plymouth shorn of the hinterland would soon wither; the only reason for its existence is service to the rural region of which it is a part. The truth is expressed in the Maori proverb part of which is recorded on the coat of arms of the city of New Plymouth: *Mauri Mahi Mauri ora*; *Mauri Mangere Mauri mate*, 'The industrious heart lives on; the indolent heart dies.'

The physical barrier that confined settlement and obstructed land communications for so long a period has not proved insuperable. Man has overcome the rugged relief in order to establish land communications, but the uplands remain and continue to hinder the freedom of his movements. Isolation formerly did not seem an anomaly. The development of the present communication pattern across the Taranaki Uplands clearly emphasises the legacy of the past. Progress and isolation are incompatible in the present age of rapid transport and communications.

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[12] In July 1949 flooding in the Uruti valley and slips in the Awakino gorge interrupted motor traffic between New Plymouth and Te Kuiti. More recently (August 1949) a large subsidence on the railway, west of Wanganui, disrupted rail traffic for a fortnight. These occurrences followed a period of prolonged rainfall.

THE GROWTH OF A CITY: AUCKLAND 1840-1950

WITH A POPULATION of 300,000 Metropolitan Auckland today is a city of world rank. One hundred and ten years ago, however, the population comprised only a score or more soldiers and surveyors engaged in laying out the new town. In 1840, the year in which Auckland was founded, the population of Greater London was almost two and a quarter million. The population of Paris in the same year exceeded 900,000, while Berlin was slightly larger than present-day Auckland.

The first European settlement at Auckland consisted of a handful of tents clustered along the northern foreshore of the Tamaki isthmus. From this nucleus the village grew as professional and business people arrived to provide for the needs of the settlers who were taking up farmland on the isthmus. By 1852 the township filled the lower half of the Ligar Valley in which settlement had been made. Houses also occupied the valley sides, and the windmill for the grinding of wheat was conspicuous on the southern skyline. With the development of new farmlands around Auckland the township grew rapidly. Although the Maori wars of the 1860's checked agricultural settlement for a short time, the population of Auckland and its region increased steadily. In 1876 residences had spread over the whole of the Ligar Valley, and Auckland had all the appearances of a busy and prosperous port.

In addition to the opening-up of farming lands in the Waikato and Northland, the exploitative industries of flax gathering, gum digging, timber milling and gold mining increased the population of the regions tributary to Auckland. These activities were reflected in the trade of the port. For from the period of initial European settlement Auckland has functioned primarily as a port, and all other functions have been dependent in large part upon the deep, sheltered harbour of the Waitemata and its associated wharves, sheds and vessels.

At the beginning of the twentieth century, the area along the waterfront had assumed its present appearance. Although new wharves were to be constructed, the majority of buildings were to remain unaltered and the urban skyline on the ridge surrounding the Ligar Valley was to undergo little change.

In 1949 residences extended from the Waitemata to the Manukau. A small number of buildings of concrete construction, varying from four to seven floors in elevation, dominated the business area. The extent of reclamation could be measured by the line of the original foreshore followed by Fort Street, three blocks south of the existing waterfront. Reclamation had temporarily ceased, however, along the foreshore of the isthmus; the city now expanded only on to the rich farmlands surrounding the urban area.

It should be noted that in the development of Auckland the urban area grew around the initial nucleus of tents in the Ligar Valley. At no period in the growth of the city was this valley challenged as the major commercial centre. The first buildings erected were the wooden storage shed and the tents of the European settlers. The position of these structures was to help to determine the street pattern of the commercial core, for the area between the tents and storehouse was to be developed as Shortland Crescent, and the beach itself to be formed as Fort Street. By 1844 Shortland Crescent had become the shopping centre of Auckland and the routeway between the offices and buildings on the headland above the bay. This street with its hall and hotel was also the social centre of the village.

Ten years later, a few additional buildings had been constructed in Queen Street along the floor of the Ligar Valley; but Shortland Crescent was still the major shopping area. As the city expanded, however, and as the Ligar Stream was confined first to a narrow drain and later covered over, Queen Street became the retail centre. Many of the buildings of lower Queen Street, as already noted, had been built by 1900. Queen Street by this date was also the focus of the street transport services. Structurally and functionally, Queen Street underwent little change in the present century; only in the types of transport does it differ markedly in 1949 from its appearance at the beginning of the century.

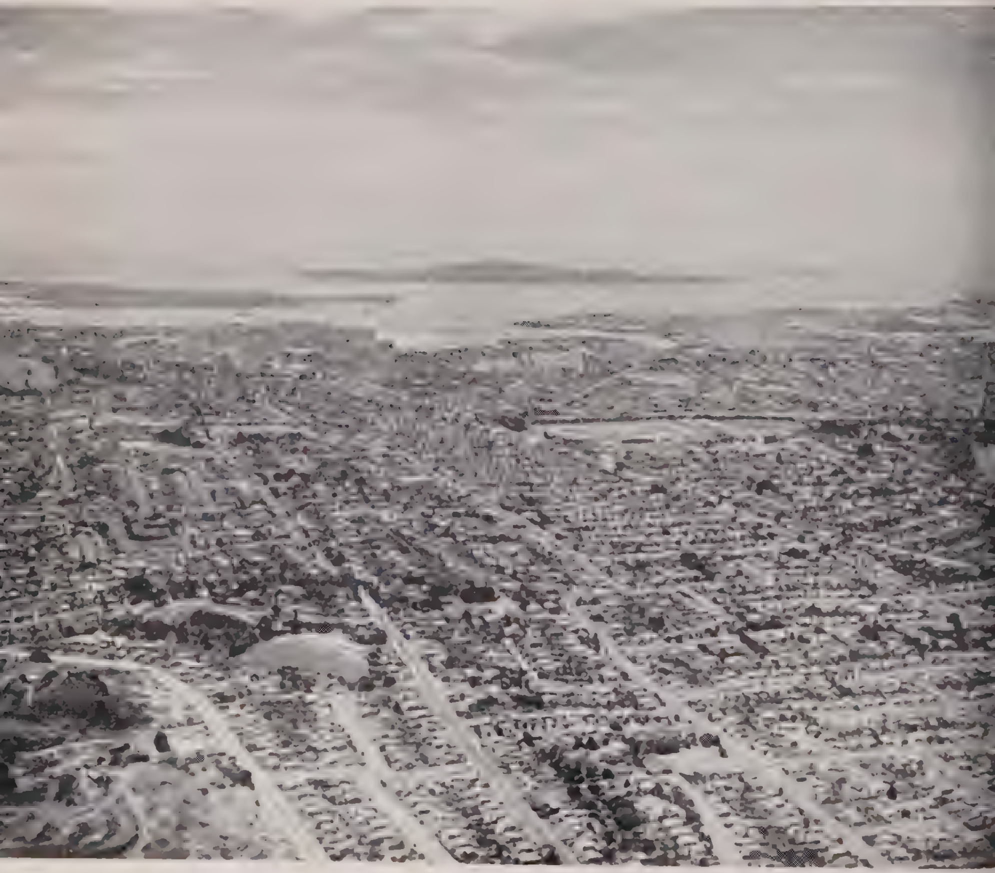
Thus, the present pattern and functions of many parts of the city and the appearance of the ensemble of buildings owe more to the first fifty years of European settlement than to the last half century of development.

PHOTOGEOGRAPHY

A PICTORIAL SURVEY OF NEW ZEALAND

6. AUCKLAND: NATIONAL METROPOLIS

Fig. 1. *'Last, loneliest, loveliest . . .' Once a huddle of tents and shacks in a remote colony, Auckland today is a dominion metropolis, and embraces within its boundaries an urban landscape that is both distinctive and picturesque.*



Photos: New Zealand Herald an
by courtesy of the Old Colonists' Museum, Auckland

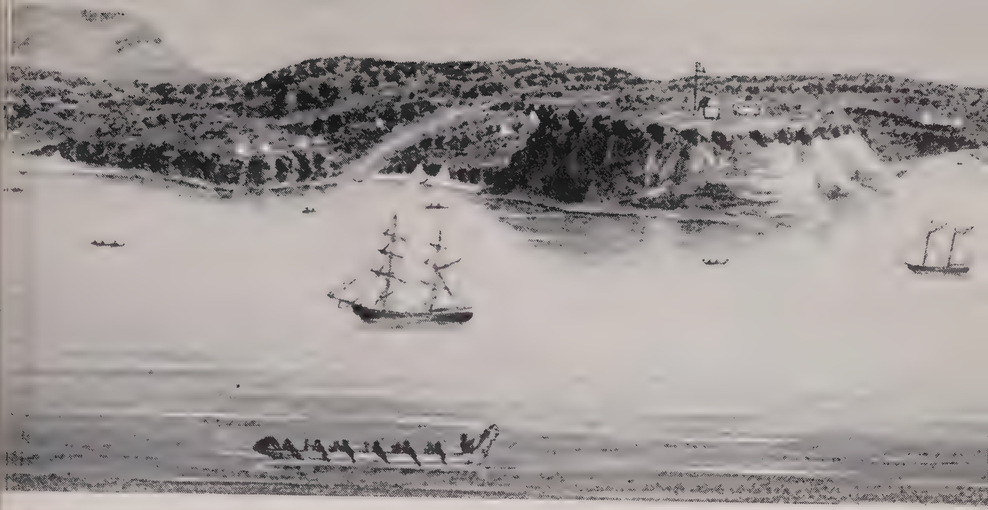
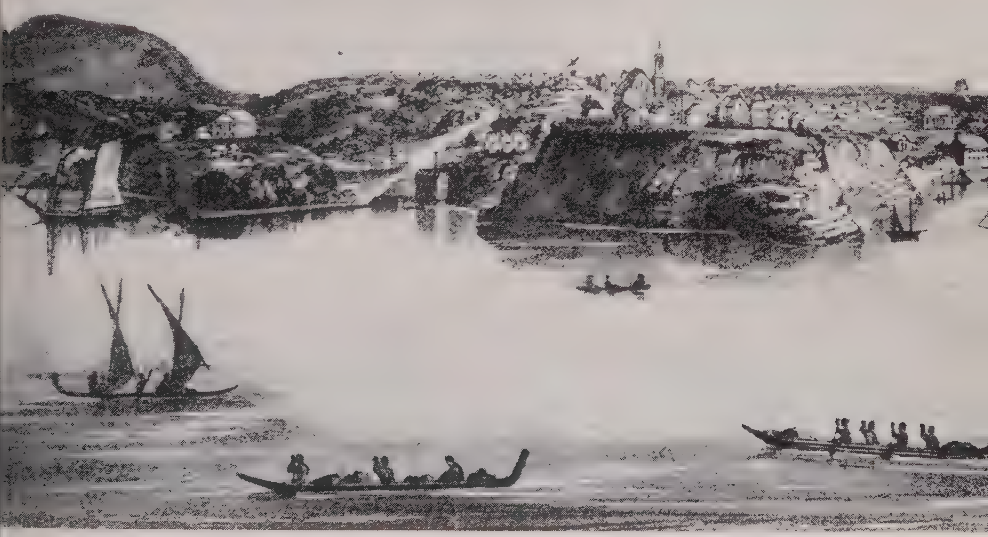
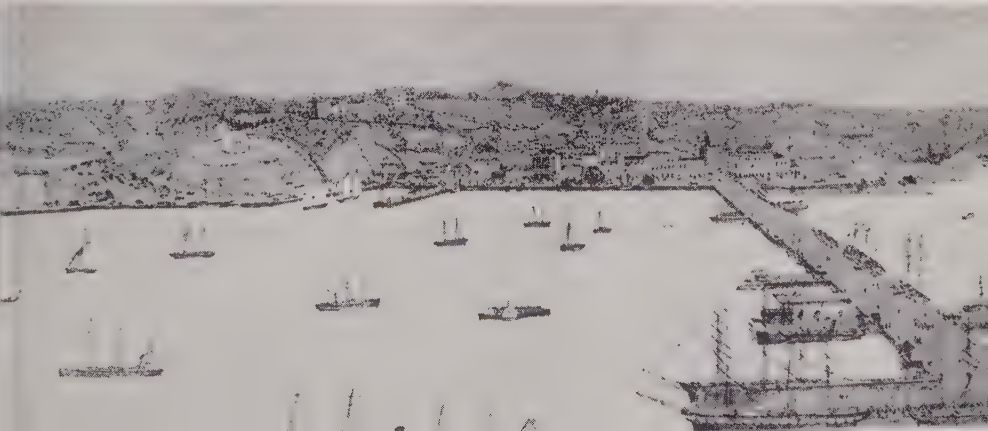


Fig. 2. *1840: The Original Settlement near Fort Britomart.*



ig. 3. *1852: The Town begins to extend Southwards from the Waitemata.*

ig. 4. *1876: Town and Seaport.*



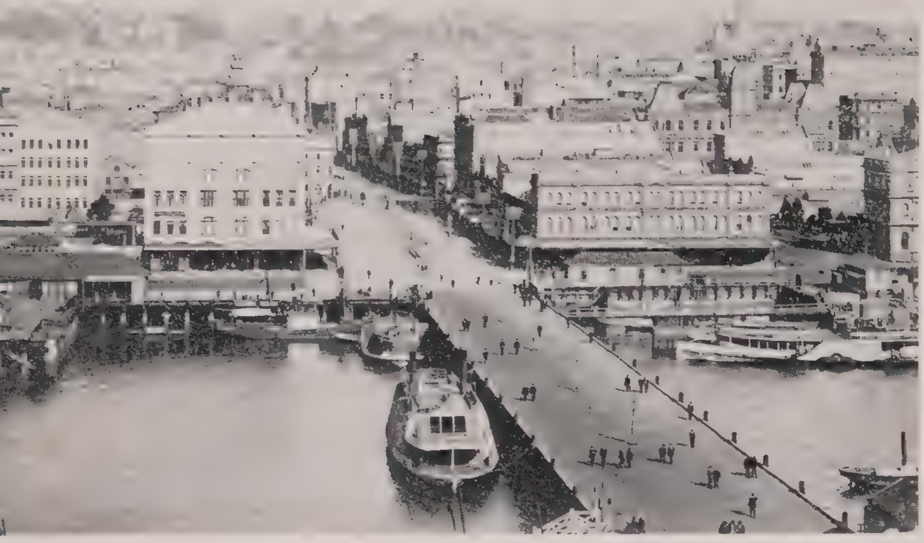
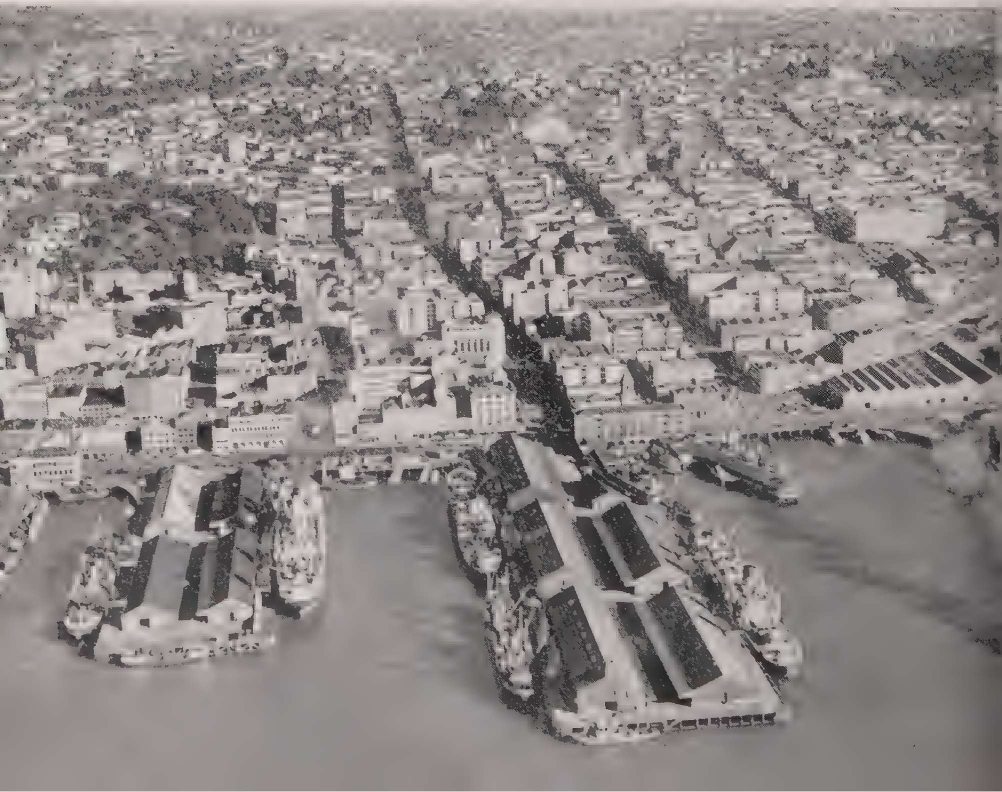


Fig. 5. *1906: The City assumes its Present Guise.*

Fig. 6. *1950: Part of a Metropolitan Landscape.*



. 1840: The
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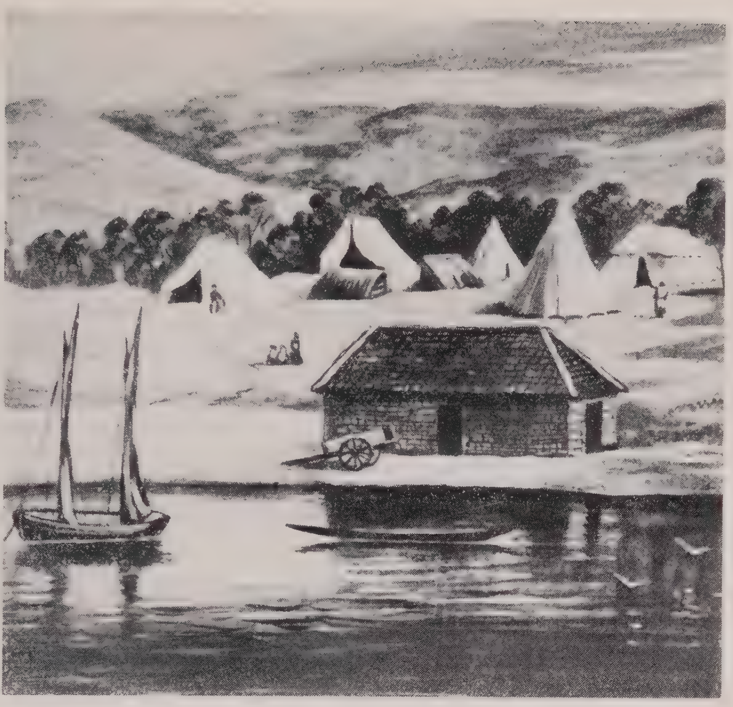
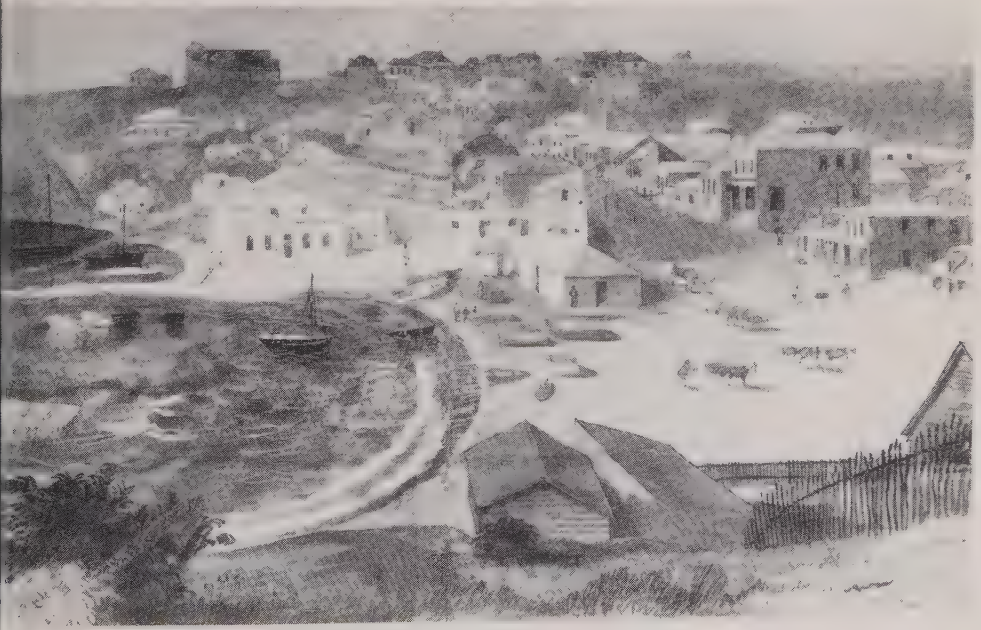


— AND THE CHANGING FACE OF ITS MAIN THOROUGHFARE

1844: Horotiu Bay, the Foreshore (Fore Street), and Shortland Street.



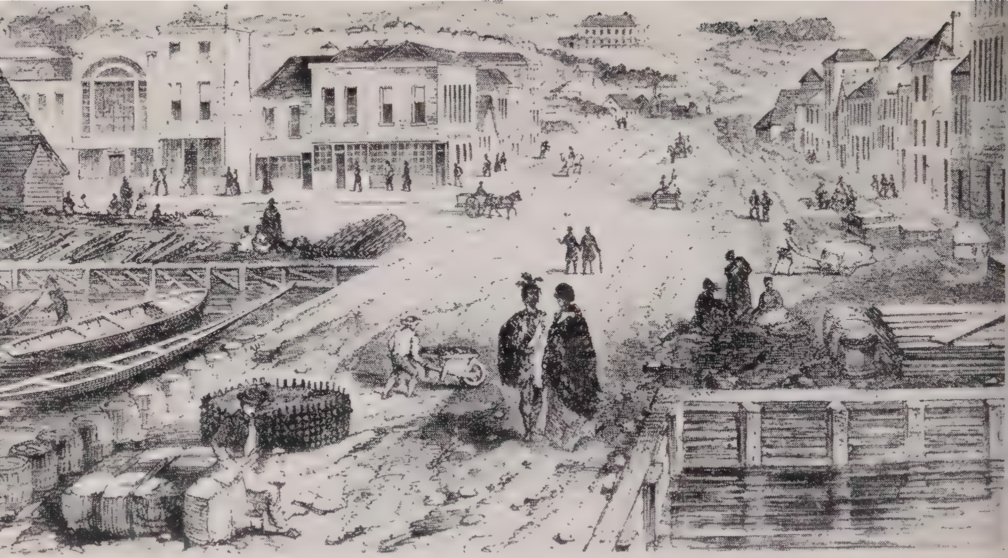
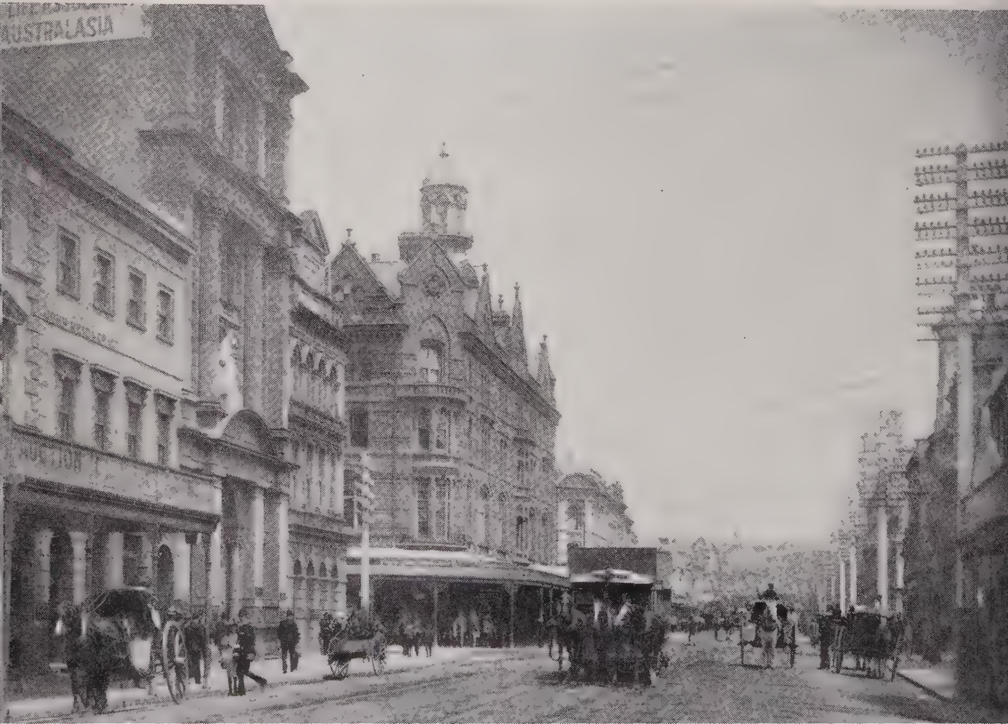


Fig. 9. *1852: Queen Street and Shortland Street. The windmill on the ridge to the south was to remain a landmark until 1950, when it was dismantled.*

Fig. 10. *1900: Queen Street and the corner of Fort (Fore) Street —Half a Century of Progress.*



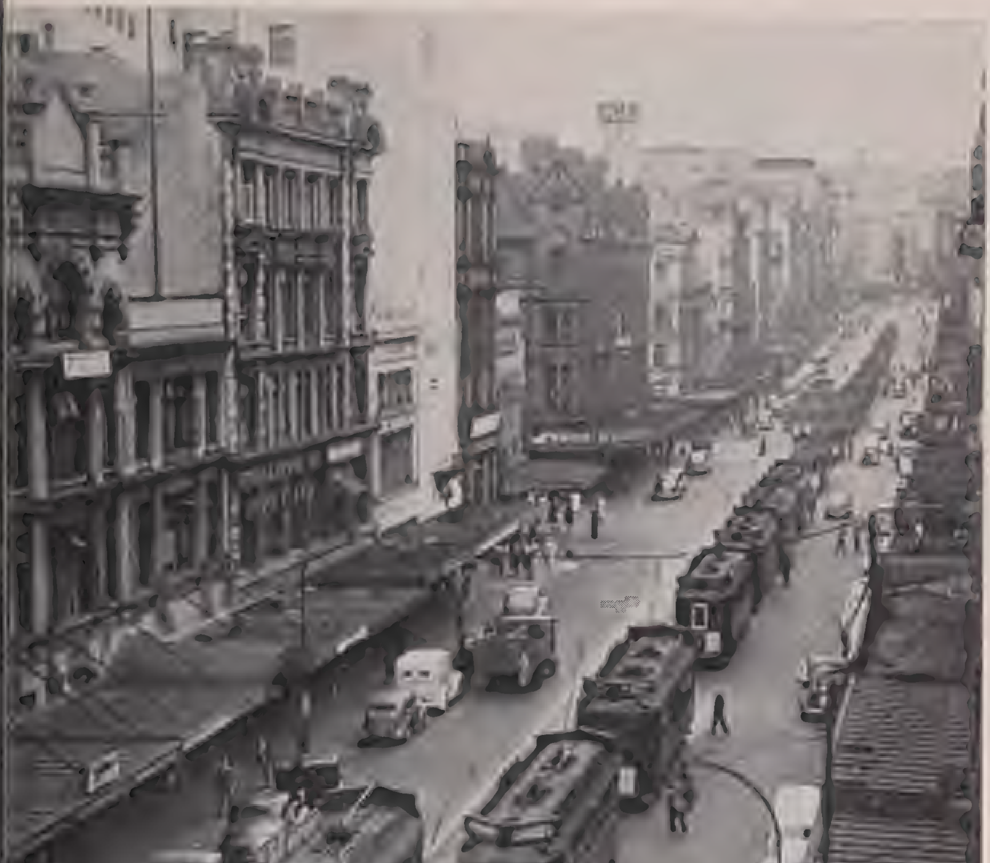


Fig. 11. *1950: Queen Street, the Heart of a City. Where once the Ligar Stream flowed quietly down its valley, today the noisy traffic of a busy metropolis surges to and fro before the facades of shops, offices, banks and hotels.*

NEW ZEALAND GEOGRAPHICAL SOCIETY: BRANCH AFFAIRS

CANTERBURY BRANCH

OFFICERS for 1950 are— *President:* Dr. G. Jobberns
Vice-Presidents: Dr. D. J. Patton, Mr. W. S. MacGibbon, Mr. J. L. Hewland
Chairman: Mr. H. M. Sweney
Hon. Secretary-Treasurer: Mr. A. V. Barley
Hon. Auditor: Mr. W. Rosenberg
Committee: Miss N. Clark, Dr. G. Uttley, Mr. A. C. Pitcaithly, Mr. A. J. Rose

Meetings of the Canterbury Branch have been held as follows—March: Australian Film Evening; 'Men and Mobs' and 'Namatjiro', with commentary by Mr. M. Spencer; April: Mr. M. Rashid, 'Things Malayan' and Miss E. M. J. Campbell, 'Early Mapmakers'; May: Messrs. Roger Duff, K. Miers and B. Wisely, Symposium on Notornis Valley; June: Dr. D. J. Patton, 'Boston, Hub of the Universe?' July: Mr. H. J. Critchfield, 'An American Looks at Southland, New Zealand'; August: Mr. J. G. Dunning, 'Northamptonshire'.

The Geography Teachers' Group has again been active. Meetings held have featured Mr. J. Dunning's impressions of the teaching of geography in England and New Zealand and Dr. G. Jobberns's views on the University Entrance Examination.

The branch has been pleased to welcome Mr. J. Dunning who exchanged teaching posts for one year with Mr. J. L. Hewland, but is sorry to lose Mr. H. J. Critchfield and Dr. D. J. Patton who are returning to the United States.

WELLINGTON BRANCH

OFFICERS for 1950 are— *President:* Dr. R. A. Falla
Vice-Presidents: Dr. P. Marshall, Mr. C. G. Bloore, Mr. E. Dalmer,
Mr. D. I. MacDonald, Mr. Alan Mulgan
Chairman: Mr. G. Anderson
Secretary: Mr. K. R. Fox *Treasurer:* Miss Betty Page
Hon. Auditor: Mr. T. L. James
Committee: Mrs. S. Turner, Mrs. J. Bewley, Mr. R. P. Graham, Mr. A. Sligo

Branch membership has been well maintained this year and an encouraging feature was the enrolment of some thirty Training College students. Yet some concern has been expressed by this committee at the rather poor attendance at the monthly branch meetings. It is possible that a rearranged programme and our misfortune in not being able to engage the Library Hall on the third Wednesday in the month is in part responsible. These difficulties are, we hope, behind us and at our remaining meetings we look forward to the support and interest to which we are accustomed.

On 29 August Professor A. Keys spoke on 'The Geography of Language'. On 26 September a member evening and panel discussion will be arranged, and at the final meeting on 24 October Mr. J. Pascoe will discuss 'New Zealand High Country'.

Auckland Branch

Officers for 1950 are— *President:* Dr. Gilbert Archey
Vice-Presidents: Sir Albert Ellis, Professor V. J. Chapman, Professor W. R. McGregor, Mr. L. K. Munro, Professor H. R. Rodwell
Chairman: Mr. Nelson Pountney
Deputy-Chairman: Mr. A. R. Harvey
Hon. Secretary: Mr. R. G. Lister *Hon. Treasurer:* Mr. L. L. Pownall
Hon. Auditor: Mr. J. K. Bedbrook
Committee: Mr. A. L. Ferguson, Mr. G. G. Harvey, Mr. L. Kearney, Mr. J. Martin, Mr. R. A. Watson

The programme of lectures and film evenings has been extended this year by excursions, one in March to the orchard, dairy and market-garden area in the Birkdale district and a second in August to four modern factories on the southern side of the city. In addition, the series of newsletters to members has been augmented.

A new departure in Auckland has been the establishment of Junior Membership. Any school may form a group under the auspices of a member of staff who is responsible for the organisation in that school.

Attendance has been good at all lectures, which were presented as follows: Mr. C. Tidmarsh, 'New Zealand Forest Products Ltd.—Its Work and Progress'; Miss Olive Mays, 'From Cairo to the Cape'; Dr. C. P. McMeekan, 'Ruakura Animal Research Station in Relation to New Zealand's Agricultural Production'; Professor C. G. F. Simkin, 'Western Europe 1948-49'; and Miss Eila M. J. Campbell, 'Domesday Geography'. The presidential address was given by Dr. Gilbert Archey who put the question 'World of Plenty?' as his subject and suggested that scientific method allied with existing technical knowledge of conservation could lead to full utilisation of the soil.

Otago Branch

Officers for 1950 are— *President:* Mr. A. H. Payne
Past-President: Mr. B. J. Garnier
Vice-Presidents: Mr. G. Simpson, Mr. P. G. Connolly, M.P., Mr. H. I. Sinclair
Chairman: Mr. W. E. Earnshaw
Hon. Secretary-Treasurer: Mr. S. G. Cook
Hon. Auditor: Mr. G. S. Kirby
Committee: Miss Coxhead, Miss Bisset, Mr. J. C. Begg, Mr. N. Dew, Mr. J. Finklestein, Mr. D. Sage, Mr. A. D. Tweedie

The 1950 session opened with the annual general meeting at which Mr. Garnier delivered the presidential address on 'New Zealand's Geographic Variety'. In April Miss E. M. J. Campbell addressed the branch on 'The Dawn of the Modern Era in Cartography' and traced the history of maps up to the fourteenth century. The following month a film evening was held at which an excellent film on Malaya was screened. In June the annual general meeting of the New Zealand Geographical Society was held, at which Dr. N. E. Odell, Professor of Geology, University of Otago, gave an account of an expedition of which he was a member in the St. Elias Range on the Alaska-Yukon Border in the summer of last year. In July Dr. D. J. Patton spoke on 'Modern Steamboating on the Inland Waterways of North America'.

GEOGRAPHIC NOTEBOOK

CONTRIBUTORS TO THIS ISSUE: In the previous number of the present volume of the *New Zealand Geographer* (Vol. VI, No. 1) readers were introduced to two facets of the historical geography of New Zealand. These have been followed up by the publication, in this issue, of an account of the historical geography of the dominion's largest city. The stages of development from Maori pa to metropolis are ably covered in this first of two articles by Mr. L. L. Pownall, Lecturer in Geography at Auckland University College; the second dealing with the urban geography of present-day Auckland will be published at a later date.

Two other articles are essays in regional interpretation. Mr. A. J. Rose of the Department of Geography, Canterbury University College, describes the regional characteristics of the Takaka Valley, a typical constricted lowland area in northwest Nelson distinctive in its isolation and its traits; whilst Mr. James W. Fox, Lecturer in Geography at Auckland University College, defines and interprets, in the light of contemporary land use, the regional totality of that part of the northern King Country adjacent to Te Kuiti.

Another member of the Department of Geography at Auckland University College provides the fourth article. Mr. W. B. Johnston traces the evolution of communication lines across one of the most inhospitable regions of New Zealand and emphasises the regional significance of access and transport.

In addition, notes and reviews have been contributed by: Professor S. Musgrove, Mr. R. G. Lister and Mr. A. W. Smith of Auckland University College; Mr. V. F. Fisher of the Auckland Institute and Museum; Mr. N. H. Taylor of the Soil Bureau, D.S.I.R.; Mr. Maxwell Gage and Mr. M. McCaskill of Canterbury University College; Mr. R. K. Wilson of Melbourne University; and the Editorial Staff.

LAND USE: A WORLD INVENTORY. At the sixteenth International Geographical Congress held at Lisbon in April 1949 a commission was set up to investigate the possibility of carrying out a land utilisation survey of the world. This commission, which met at Worcester, Massachusetts, last December under the chairmanship of Dr. S. Van Valkenburg, has issued a preliminary report in which some general conclusions and proposals are outlined. Briefly these deal with the scope of the proposed survey, its value, the categories of land use to be mapped, and the means whereby such a project could be successfully organised, financed and integrated.

Objective studies of land utilisation problems are not novel. For many years now such projects have been carried out in many parts of the world, but always unrelated to each other and characterised by no uniform system of classification. In one case only has such a project attained a complete nation-wide coverage—that of the Land Utilisation Survey of Great Britain which published its first map on the scale of one inch to the mile in 1938 and its first County Report in 1936. In New Zealand several regional land use studies have been presented as theses for the M.A. Degree in the University of New Zealand, but they have been essentially local studies with individually-applicable classifications. However, a broader project covering land utilisation in the Auckland Province, which is at the moment under way in the Department of Geography, Auckland University College, could well be the basis of a dominion-wide survey since the classification adopted has a universal application.

As Dr. Van Valkenburg has said, a land utilisation survey 'based on factual knowledge is a necessary and proper foundation for plans of improvement and development, especially in those areas commonly regarded as underdeveloped. Only by recording land use facts on maps can actual areas and distribution be shown . . .' (*Economic Geography*, Vol. 26, 1950, p. 1). Maps are a geographic tool and the compilation of factual knowledge by means of this tool becomes essentially the task of the geographer. Yet a simple objective survey can be handled by more than the professional geographer, for the mapping of land use according to a preconceived system of symbols is not in itself inherently difficult, but it is laborious and time-consuming. Dr. Dudley Stamp secured the cooperation of school authorities and school children all over Great Britain. In New Zealand the upper classes of post-primary schools could find in the work of the survey valuable material for their own local studies, whilst members of the New Zealand Geographical Society themselves could make valuable contributions. The final work of integration and interpretation must of necessity fall to the lot of the trained geographers who would direct the scheme as a whole and produce the regional studies based on the data collated.

Difficulties are bound to arise; the lack of a suitable base map comparable with the British Ordnance Survey series on a scale of six inches to the mile, the dearth of one-inch maps even, and finance itself, rank high among the obstacles to be overcome. Yet with willing cooperation between government departments, academic geographers, educational authorities and all those willing to spare a little time to the compilation of maps, the survey can be completed. There will emerge a picture of land utilisation more complete than the Domesday Survey, itself an example of the meticulous culling of information, and there will be completed a national inventory which could be a basis of future land use planning in New Zealand and which can make its contribution to the wider project proposed by the International Geographical Union and supported by the specialised agencies of the United Nations.

A CLARIFICATION OF TERMS. In the review of the Seventh Pacific Science Congress published in the *New Zealand Geographer*, Vol. V, No. 1, p. 90, there appears the statement, apparently attributed to Dr. Kellog, that 'further research into the North Auckland podsols is desirable before we accept them as zonal podsols'. The accuracy or otherwise of this statement depends on the meaning ascribed to 'zonal podsol'. In *Soils and Men* (U.S. Department of Agriculture Yearbook, 1938) a zonal soil is defined as 'any one of the great group of soils having well developed soil characteristics that reflect the influence of the active factors of soil genesis—climate and living organisms, chiefly vegetation'.

Podsols are developed under a mor-forming vegetation, and have usually been described from the cool temperate region of the northern hemisphere. In this region weathering is relatively slow and the mineral constituents of the soil are weakly to moderately weathered. In New Zealand the mor-forming vegetation (of which the kauri is a noted example) enters the warm temperate zone, in which the soils are strongly weathered. It is agreed that the process of podsolisation as at present understood (i.e. the movement downward of iron and alumina due to the conditioning effect of a mor-forming vegetation) is the same in both cases. In North Auckland, however, owing to active weathering, the podsol pattern is very strongly fixed on the mineral skeleton of the soil, whereas in the cool temperate zone the impress is much weaker. For example, in North Auckland the silica-alumina ratio of the clay fraction of the A_2 horizon may be as high as 80 : 1 whereas elsewhere the ratio is commonly 3 or 4 : 1.

The Soil Bureau of the Department of Scientific and Industrial Research does not contend that the North Auckland podsols are the same as those described from the cool temperate zones of the northern hemisphere, but it does claim that they are the counterpart in the strongly weathering zone of the podsols of the more weakly weathering zone. For this reason the North Auckland podsols are provisionally classified as strongly-weathered podsols and are included among the zonal soils.

It is a clarification of the concept of 'zonal podsols' that is needed rather than 'further research into the North Auckland podsols'. —N. H. TAYLOR

M.A. THESES IN GEOGRAPHY. During 1949 the following theses were presented by students at Canterbury and Auckland University Colleges for the Degree of M.A. in the University of New Zealand.

From Canterbury University College:

Land Use in Levels County, South Canterbury, J. A. Adam;
Population Distribution in South Canterbury, June Chapman;
Hawarden, North Canterbury, Noeline Clark;
The Waimea Plain, Nelson, A. J. Crawford;
Waimate, M. K. Denholm;
Irrigation in Central Otago, C. Duncan;
Akaroa, J. H. Ford;
The Settlement and Development of the Rangitikei Valley, T. L. Hills;
Communication Lines across the Taranaki Uplands, W. B. Johnston;
(see also this number of the *New Zealand Geographer,* pp. 171-189);
Contrasts in Rural Landscapes in New Zealand, 1840, 1881, 1921, L. D. Lake;
Ashburton and its Tributary Region, W. I. Ross;
The Awatere Valley, Marlborough, L. A. Rule;
Ohai—A Southland Coal-Mining District, H. D. Ryan;
The Mackenzie Basin, South Canterbury, R. K. Wilson.

From Auckland University College:

The Location, Form and Function of Taumarunui, Leslie Black;
The Significance of Railways in the Auckland Province, J. B. Gerrard;
The South Auckland-Waikato Region, W. A. Herbert;
The Borough of Whangarei, An Urban Study, Constance Lepine;
Human Geography of Aotearoa about 1790, G. R. Lewthwaite;
(see also the *New Zealand Geographer,* Vol. VI, No. 1, pp. 35-52).

Copies of these theses are deposited in the respective college libraries.

TWO NEW MAPS. Recently there have appeared two additions to the New Zealand Topographical 1 : 25,000 Series (N.Z.M.S. Series No. 2)—sheet N.43/7, Ness Valley, and sheet S.83/3, Templeton. These two maps demonstrate the steady improvement in cartographic techniques already apparent in previous issues of a series which now bears comparison with its British counterpart. The draughtsmanship is fine and neat and the reproduction excellent, particularly on the Templeton sheet. Marginal information is now more clearly set out and more complete, and several innovations are to be noted. State Highways and Main Highways are indicated in red and are numbered, and the whole series of symbols has been recodified in two neat reference panels. On the Templeton sheet the fifty-foot vertical interval has been reduced to twenty-five feet by the interpolation of the intervening contours. In short, these are two excellent maps eminently suitable for work in the field, especially for the mapping of land utilisation. It is a pity that the publication of this series must be so slow.

These sheets will be added to the collection of maps in the society's library, where is now housed a complete set of New Zealand topographic maps on scales of 1 : 63,360 and 1 : 25,000 and the general catalogue of maps issued by the Department of Lands and Survey. As the publication of new sheets proceeds and as copies are received, notice will be given in these pages of the *New Zealand Geographer*. In this way members will be able to keep abreast of cartographic developments in this country. The society is greatly indebted to the Surveyor-General for providing these facilities.

INTEGRAL PART OF NEW ZEALAND. A recent addition to the literature of the Pacific is the publication of the Department of Island Territories entitled *Cook Islands: New Zealand's Tropical Province*. The issue of this short illustrated brochure is to be welcomed, firstly because it emphasises that these islands are in actual fact part of the Dominion of New Zealand, and secondly because it represents an attempt by the government to make New Zealanders more aware of some of their responsibilities in the Pacific.

Yet it is not enough to publish booklets and to prepare films which describe the attractions of life in the islands and extol the good work that is being done in education, health and agriculture, but which at the same time tend to disregard urgent problems vitally affecting the islands' economy. The picture is totally different when viewed from Rarotonga and the other islands of the group. Tomatoes and oranges which fall rotting to the ground because there is no occasion to pick them, fruit mouldering in their cases as delay follows delay, and no export of bananas because shipping facilities are not available—such are some of the trials of primary producers, who themselves constitute more than fifty percent of the total working population in the Cook Islands.

Irregular and intermittent shipping poses problems which defy solution. When the government-owned vessel, *Maui Pomare*, does not call for two months, hardship must occur, and the rotting of fruit represents a considerable financial loss to growers and, eventually, to New Zealand. Moreover food supplies dwindle alarmingly and at the date when this booklet came to hand this province of New Zealand was without adequate supplies of flour, sugar, potatoes, bacon, meat, tobacco and beer. This is catastrophic enough, but when these deficiencies are consequent upon bad organisation of governmental shipping facilities there is no excuse. The fortnightly air service provides no adequate substitute, and until improvements in transport are effected this outlying province of New Zealand must remain the poorer for its association with the dominion.

IN OUR CONTEMPORARIES . . .

1. *In New Zealand Journals* . . .

THE COASTLINE OF MID-CANTERBURY

AN ERODED COASTLINE: R. Speight, *Transactions and Proceedings of the Royal Society of New Zealand,* Vol. 78, Part 1, February 1950, pp. 3-13.

The late Professor Speight closed a long career as a writer on the geology and geomorphology of Canterbury with this account, published posthumously, of the coastal area between the Rakaia and Rangitata Rivers. Although the style is somewhat diffuse and obscure, this useful contribution to the geography of an area more or less neglected since the time of Haast contains much that is of interest to the physiographer.

Speight recalls familiar evidence for the geologically recent submergence of Canterbury and adds a little that is new. He mentions also a raised stormbeach near Lake Ellesmere indicating an earlier slightly higher stand of sea level, but it is clear that this coastal sector is lacking in flights of raised beaches and shore platforms compared with most other parts of New Zealand. One is often tempted to try and link these evidences of variable sea level with the world picture of glacio-eustatism, that is, the control of sea level by the varying amounts of water locked up in ice sheets during climatic fluctuations. But in New Zealand, one must tread warily in these matters, for this part of the earth's crust has been anything but rigid and inflexible since the beginning of the Pleistocene, and plenty of evidence exists for quite recent differential uplifts and depressions in Canterbury and elsewhere. Speight was well aware of this, for in this paper he speaks of a present 'period of instability', and then tentatively puts forward a hypothesis of non-uniform subsidence of the Canterbury Plains coast.

The main purpose of this note is to attempt to show that the warping theory is unnecessary and, moreover, liable to distract attention from the otherwise satisfying picture drawn of the Canterbury coast as a product of normal marine erosion. The case for regional submergence is soundly based on old peat beds that are now at or below sea level, and on the general structure and composition of the gravels of the Canterbury Plains as disclosed by innumerable wells. On the other hand, the case for non-uniform depression is based entirely on heights of the present sea cliffs which decrease both northwards and southwards from a maximum of about seventy feet near the mouth of the Ashburton River. Immediately after stating the hypothesis, Speight is inclined to discount it for lack of what he terms 'coastline evidence', and because he realised that the same effect could have been produced merely by the cutting-back of the broadly convex plains by marine erosion. Yet surprisingly he returns to the warping theory towards the end of the paper when considering the offshore profile. His difficulty seems to have been with the width of the strip removed by marine erosion from opposite the highest cliffs, but in this he fails to appreciate the extent to which wave-planation has been assisted by the continual removal of waste by vigorous longshore drifting and by wave-action on this exposed southeast-facing coast. If the difficulty had indeed been as serious as Speight seems to have thought, it would have applied with equal force to the warping theory.

The seaward margin of the Waitaki Plains consists of a very similar line of cliffs, carved from alluvium, and rising to a maximum height opposite the axis of the valley. But the geological history and structure of the Waitaki Valley would be very much against an attempt to explain the broadly convex cross-profile of the lower valley floor as the result of either median upwarping or lateral downwarping, which in the present issue amount to the same thing. A hypothesis of transverse warping seems equally unnecessary and undesirable for the Canterbury coast, and lacks the necessary support from drainage adjustments such as deflected minor streams on the plains surface.

The coast of mid-Canterbury may therefore be offered as a good, uncomplicated example of a submature coastline, developed by normal marine erosion from an initially simple coastline of submergence. For a short title, it is hard to improve on that chosen by Speight himself—'An Eroded Coastline'.—MAXWELL GAGE

FORESTS AND THE FUTURE

IMPRESSIONS OF NEW ZEALAND FORESTS AND FORESTRY: H. H. Chapman, *New Zealand Journal of Forestry*, Vol. VI, No. 1, 1949, pp. 4-10.

Professor Emeritus H. H. Chapman of the Yale School of Forestry and Chairman, Forestry Section, Seventh Pacific Science Congress, writes of his general impressions of New Zealand's forests and their management. The article indicates that Professor Chapman has become fully acquainted with the present status and with many major problems concerning the dominion's forests. With an eye to the future he implies that the timber industry has excellent possibilities for further development. 'New Zealand by reason of its climate and soils is peculiarly favoured as a region in which to grow large quantities of pine timber for export to a world in which there is an increasing shortage of this commodity.'

With the depletion of kauri, rimu, kahikatea and other indigenous species, and because of the problems posed by their comparatively difficult and slow regeneration, it seems that future supplies of timber will flow mainly from exotic plantations of insignis pine (*Pinus radiata*), Douglas fir and European larch. Recent experiments indicate that the loblolly pine and the slash pine, which are native to southeastern United States, will be increasingly important as timber yielders. These two pines appear to be more dependable than insignis, particularly on the gumland soils of the 'winterless north'.

The future of insignis plantations on the Canterbury Plains is precarious because of the confining effect of a hard pan which restricts root growth. The trees are thus relatively easy prey to violent winds that show 'an increasing tendency to blow down these pines as they increase in size'. The Nelson area, on the other hand, is perhaps the most promising area for exotic plantations, especially of insignis pines. Physical conditions are nearly ideal for rapid growth and reproduction. Furthermore, a local market for shooks and the proximity to coastal and overseas transport greatly enhance the physical advantages of the region.

Five species of native beech, which are concentrated in the South Island, represent the only extensive reserve of indigenous commercial forest. This could supply the dominion with durable wood for posts and construction lumber of excellent quality.

Proper silviculture could make these forests equally as productive as the famous beech forests of Europe. The problem of preventing deer from grazing on and destroying the young seedlings is a serious one. However, it has been solved in Germany and there is no reason why deer control could not be successful in New Zealand.

The development and efficient management of beech forest would greatly alleviate New Zealand's reliance upon imported hardwoods and increase the economic stability of the timber industry. Nevertheless labour remains a problem. Until it is solved, silviculture practices must of necessity be restricted in scope, and forests, both native and exotic, will remain prone to the ravages of fire and pest despite the protective measures already undertaken.—A. W. SMITH

2. *In Overseas Journals* . . .

A METHODOLOGIC VIEWPOINT

ECONOMIC GEOGRAPHY AND GEONOMICS: C. J. Robertson, *Geography*, Vol. XXXV, No. 1, March 1950, pp. 38-41.

It has been emphasised recently by no less an authority than the late Dr. Isaiah Bowman that attempts to define the field of geography are merely theoretical and academic. Nevertheless it must be conceded that students of a discipline should be aware of the viewpoint and methodology of the subject in which they undertake research. Methodologic discussions have also largely crystallised opinion as to the nature of geography. As a result there is today common agreement among many geographers that the general field of this discipline is the study of areas. Unfortunately there is not always agreement by geographers on the theoretical boundaries between subdivisions of their subject and other studies, as, for example, between plant geography and plant ecology. In no branch of geography is this more true than in economic geography. On this account, this concise statement by C. J. Robertson is of particular interest.

Robertson clearly states that the contribution of geography to the social sciences stems from its regional approach—'the concept of the region and the technique of regional delimitation'. But, as he points out, economic geography has long been regarded in English universities as systematic or general rather than as regional in approach. This results in the definition of broad patterns of economic activity and in the formulation of principles so generalised, in order that they may have universal application, that they are of little value. A similar conclusion was noted by Dr. V. C. Finch in 1944 when he stated that abstract analysis and the formulation of general principles has given little to economic geography. On the other hand, states Robertson, only studies in regional economic geography which attempt to examine the individuality of areas on the basis of their complex of economic phenomena can possibly build up a realistic world pattern. Such studies, however, might equally well lead to the recognition of the fact that no practical classification of world patterns is possible because of the infinite variety of individual regions.

In order to assess the individuality of economic phenomena in a region—what might well be termed the 'econogeographic' character of that region—the geographer requires training in the field of economics. He does so, one might add, not because economic geography 'derives its concepts largely from the field of economics and its method largely from the field of geography' as a recent British writer has restated (C. A. Fiske: 'Economic Geography in a Changing World', *Trans. and Papers, Inst. British Geographers*, 1948, p. 85) but in order that the geographer may use the tools of the economist with facility and confidence.

Robertson also suggests that there are a large number of problems outside of the scope of economic geography, such as those 'arising from the very high degree of dependence [of a country] on certain exports or from highly concentrated localisation in the production of certain commodities'. To such studies Robertson proposes that the name 'geonomics' might be given, implying the same relationship to economic geography as exists at present between geopolitics and political geography.

The contribution made by Robertson helps to place economic geography in its correct perspective. Whether regional or general in approach, economic geography is concerned simply with the analysis and description of areas of the earth on the basis of their element complexes of economic phenomena. By doing so he has shown that in England, as in the United States, there is a clear appreciation by some geographers of the difference between economics and economic geography. His suggestion for establishing a marginal study between these two subjects is of value insofar as it insures against any branch of knowledge being overlooked through too rigid a definition of the respective disciplines.

Robertson has made it clear that such problems could not be considered as studies in economic geography. Whether they fall within the field of economics or not is a question that can be answered only by the economist. If such problems can be adequately solved by the economist there can be no need for geonomics as an independent discipline.—L. L. POWNALL

REVIEWS

The Proper Study of Mankind

AN INTRODUCTION TO SOCIAL ANTHROPOLOGY, VOL. I. By Ralph Piddington. Edinburgh: Oliver and Boyd, 1950, pp. 442.

Dr. Piddington's book is exactly what its title indicates—an introduction to the study of social anthropology. The university students for whom it is particularly designed will find in it a clear-headed and sober exposition of the basic materials of their subject. They will become acquainted with those peoples, such as the Iroquois and the Trobriand Islanders, into whose habits the fullest investigations have been made, and with the importance of such institutions as exogamy, lobola, moieties, and classificatory systems of nomenclature. 'Social anthropology', as Dr. Piddington understands it, is restricted to primitive societies; he does not venture into the dangerously fascinating speculations which arise from attempts to apply its principles to contemporary society. His approach is the 'functional' one of Malinowski; that is to say, human behaviour is judged, not *in vacuo*, but as part of a total pattern of social living which, in turn, is shaped by the complicated tangle of forces set up by human needs. It may be claimed that this volume does not contain anything new except the detailed account of the Karadjeri tribe of northwestern Australia, of which the author has made a personal study; but a second volume is promised in which the more controversial and specialised aspects of the subject will be treated.

Dr. Piddington's appointment as the first professor of anthropology at Auckland University College makes his opinions on the general value and bearing of his subject of particular interest. One is at once struck by his sensible moderation and lack of dogmatism. He has no line of goods to sell, and will have nothing to do with those theorists, such as George Thomson, who would relate the practices of present-day primitive societies to tendentious hypotheses about the nature and habits of prehistoric man. He points out that we know nothing at all about prehistoric man except for the limited information which archaeology can supply about his material culture. He rightly disapproves of the haphazard methods of earlier anthropologists, and of the selective interpretations of some of their successors; equally rightly he insists on the complexity of his subject, and the peril of generalising about any form of human behaviour, primitive or civilised. Anyone who is tempted to claim for anthropology the role of a key study in a system of secular humanism will receive a cold douche of common sense from Dr. Piddington, who tells us bluntly that 'social anthropology is at present not equipped with any really adequate technique either for comparison or classification' (and therefore, *a fortiori*, for evaluation) of human cultures, and that 'our categories are instituted *ad hoc* according to the purpose of our investigation'. In other words, a technique which is directed towards the 'pattern of human needs' will necessarily remain a predominantly descriptive study until those needs themselves are understood better than they are at present. It would not be quite true to fling at the heads of the anthropologists the old jibe from which the economists used to suffer—'they could all be laid out from end to end without reaching any conclusion'—but, to put it in the author's words, 'things being as they are, it is better to confess ignorance than to institute cultural comparisons which are superficial, misleading and pretentious'.

The writing of the book is clear and sometimes vigorous. There is a welcome absence of jargon; the necessary technical terms are well defined, kept for use where they are required, and not employed for display purposes. The only criticism offered is that the author is sometimes led, in his anxiety to make his meaning quite clear, into certain glimpses of the obvious. Perhaps in his second edition he will either alter or remove one or two sentences of this kind, from his discussion of polygyny (p. 111): 'To take a hypothetical and unreal example, if the sexes are equal in number and half the men have two wives each, it is clear that the other half must remain unmarried'. Nor, perhaps was it necessary to illustrate the reciprocal relations between gifts and services by the diagrams on pp. 274-5. But these are small points in a sound and readable book which should serve its purpose well. The bibliographies and bibliographic commentaries are especially useful and clear.—S. Musgrove

Canterbury Saga

THE STORY OF CANTERBURY. By A. H. Reed. Wellington: A. H. and A. W. Reed, 1949, pp. 326.

This book should further enhance the enviable reputation that Mr. Reed has made through his many popular works in New Zealand history and geography. The most recent books giving any comprehensive treatment of the early history of Canterbury were published more than forty years ago and many of the most valuable sources have long been out of print. The centennial year of Canterbury will be the occasion for an official history of the province and several local histories are in preparation. Meanwhile Mr. Reed has done the people of Canterbury a fine service in making available a popular narrative of Canterbury from its beginnings in Maori times down to the close of the provincial era. His book will have a wide appeal to New Zealand readers in general and it is well within the scope of every secondary school pupil. It is entertaining and picturesque in style, yet it is the product of diligent research based on authoritative source material.

The author modestly forbears calling the book a history and is justifiably selective in the topics treated. He has chosen some of the more colourful and exciting aspects of Canterbury's story and treats lightly the more prosaic facts of political and economic history. Yet a sound balance is maintained and the volume provides a good record of the progress and achievements of the province in the first quarter of a century after the coming of the *Charlotte Jane* and her sister ships.

The book relates how successive waves of Maori invaders came down from the North Island and occupied the coastal fringe; how a handful of whalers, surveyors, and French and British settlers made their first foothold on Banks Peninsula and then spread to the swampy borderlands of the plains. It pictures the coming of the 'Pilgrims' and shows the growth of their capital city from a handful of 'V' huts and raupo whares on a riverside fen. The hordes of merino sheep from Australia are described crossing the treacherous mid-Canterbury rivers and spreading over the tussock grasslands as far as the alpine snowfields. The stories of the establishment of a South Canterbury sheep farm and of the most famous of the mid-Canterbury mixed farms are related in some detail. Canterbury owed much of its rapid progress to the early development of a railway network and a chapter is devoted to an account of railroad exploits. Picturesque details are given of the construction of the Lyttelton tunnel in 1867, an engineering feat almost unique in the world at that time and no mean task for a community numbering barely 20,000. One feels that we have lost something of our sense of community spirit and respect for a job well done since the day when the Superintendent of Canterbury tendered a banquet to the tunnel workmen, held in the tunnel itself, the interior of which was beflagged and gaily decorated for the occasion.

Many of the personalities are described who gave colour to early Canterbury life—explorers, statesmen, clergy and swaggers. A full chapter is given to Jock Mackenzie, the explorer and scamp who became Canterbury's most popular figure of legend. Due credit is given to the ideas and work of Edward Gibbon Wakefield in the chapter, 'Architects of the Settlement'. Canterbury was the last and most characteristic of all the Wakefield settlements and Mr. Reed's suggestion that Canterbury should, as part of its centenary celebrations, provide some enduring memorial to its designer, deserves full consideration. In the concluding chapters the scene moves west, first, to the surf-beaten shores, dense forests and bustling mining communities of Westland in the early years of its gold rush. Finally the author tells the epic story of Canterbury mountaineering, centred mainly in the Mount Cook region, in the last two decades of the century.

The book is attractively illustrated with numerous pen and ink sketches and several maps. Short quotations from contemporary newspapers and early writers are skilfully blended with the text and add to the vividness of the narrative. Mr Reed has recaptured for us much of the atmosphere of early Canterbury and his book should find a warm welcome among those who take pride in the history of their own country.—Murray McCaskill

Before the Coming of the 'Fleet'

THE MOA-HUNTER PERIOD OF MAORI CULTURE. By Roger Duff. Wellington: Department of Internal Affairs, 1950, pp. 405.

This work is a valuable contribution to New Zealand archaeology. It sounds the death knell of the theory that Polynesian settlement was preceded by a Melanesian migration of people referred to by various names but most generally by the term Moriori. Evidence is produced to show that the earlier group—the moa-hunters—was characteristically Polynesian.

From the discovery at Wairau Bar, Marlborough, of human burials with which were associated implements and ornaments, Duff undertook a systematic excavation of the area. Most important was the recovery of perfect moa eggs showing evidence of perforation by human hands, and various bone specimens manufactured from a species of moa, *Euryapteryx gravis*. The results of his investigations are contained in this publication, which in type, quality of paper and illustrations is a model of book production.

His general thesis is that this moa-hunter culture preceded the later Maori period derived from the migrations of 1350 A.D. Duff suggests that the late fifteenth century terminated the moa-hunter period in the South Island. The introductory chapter discusses the relationship of the moa-hunters to Polynesia, and then follows a short but adequate description of the Wairau camp. The real core and essence of the book is the chapter recounting the narrative of excavation. Carefully noting the evidence as the work proceeded and entering the results in field books, this represents the best contribution in the book. As an example of meticulous care, he writes, referring to moa egg fragments, 'A day was spent in carefully numbering and removing all visible fragments'. Succeeding chapters fully describe the objects recovered, which included ornaments of various types, stone adzes and fishing material. The descriptions are excellent and all important pieces are illustrated.

In these chapters, however, too much emphasis is placed on typological studies, particularly stone adzes, without sufficient available evidence as to age to support the generalisations. Evidence of age must result from the finding of large numbers of the same type of specimen in different areas at similar levels or strata to which a reasonably accurate age can be assigned. Thus the finding of the 'side-hafted' adze at Wairau and other localities in the South Island, and some five specimens in the North Island, is not clear evidence, since it is based on typology alone, that the North Island specimens from the Coromandel area are an indication of a region 'where the southern culture left strongest traces'.

Referring to New Zealand adze forms in relation to Polynesia, Duff suggests that when dispersal took place from the Society Islands, the 'whole tool kit of types' was passed on and the types distributed to marginal areas. Here lies the weakness of the argument. If stone adzes persist as evidence, and Duff has stressed that this is so, then surely the 'whole tool kit' should be still found in the Society Islands and not a few types only.—V. F. Fisher

Agricultural Possibilities on the West Coast

SOILS AND AGRICULTURE OF WESTLAND, N.Z. By H. S. Gibbs, A. D. Mercer and T. W. Collie. Wellington: Department of Scientific and Industrial Research, 1950, pp. 24.

Scientific studies of Westland have been largely concerned with the mineral resources of gold and coal which have long provided the economic mainstay of the region. In recent years, more especially since the war, there has been a growing popular interest in the agricultural possibilities of Westland and the steadily mounting volume of farm production suggests that in the future the region's economy will be more broadly based. The publication of a reconnaissance survey of Westland soils is therefore most appropriate, coming at a time when public opinion on the West Coast is more aware of the potentialities of its farmlands and its farmers more appreciative of the need for improved practices in the management of soils and pastures.

The main contribution of this bulletin is in the two coloured maps on a scale of four miles to one inch showing the distribution of twenty-three soil types and in the brief descriptive notes of the profile characteristics. Under the superhumid climatic conditions and the dense podocarp forest cover, podsolisation is the characteristic soil-forming process in Westland. Most of the soils of the gently sloping terraces and undulating hill lands are classified as podsols, ranging from immature stages on the coastal sand dunes to mature ground water podsols on the older, high level terraces. Rarely have these soils been developed into agricultural land. Drainage is a most difficult problem on the more mature types as the downward movement of water is impeded by the cemented iron pan and lateral seepage is impeded by the compact structure of the soil layers above the pan. The majority of Westland's farms are located on the permeable and slightly leached recent soils formed from alluvial deposits in the flood plains of the major rivers. Five types of recent soils are recognised on the basis of differences in soil depth and structure but since these qualities differ widely even within individual farm boundaries, it would require a larger scale map to portray accurately their distribution. Brown loams developed on ultrabasic rocks in the far south, organic soils on the numerous scattered peat bogs and skeletal soils on all the steep hill land complete the list of soil groups, but none of these has any agricultural value.

The accompanying notes on various assorted items such as history and population, vegetation, climate, agriculture and erosion are too brief and sketchy to make a coherent descriptive statement. Indeed it is to be regretted that the opportunity was not taken to publish in this bulletin a report on the farming industry of Westland prepared by members of the Lincoln College staff under the auspices of the Department of Scientific and Industrial Research. This report, made in 1948, has been circulated only in mimeographed form and deserves a much wider publicity than it has received. Perhaps the most valuable result of the reconnaissance soil survey has been to delimit those areas that are likely to have any prospects for increased agricultural production. In view of the very scattered distribution of productive soils in Westland an estimate based on planimeter measurements of the total areas occupied by different soil types would have been a welcome addition. The salient fact emerges, however, that the proven agricultural soils are very limited in area and highly fragmented in distribution. It may come as a sobering thought to those enthusiasts who advocate for the early completion of the Haast Pass-South Westland road that this highway would open up no considerable areas of recent soils, the only soil group on which successful pastoral farming has been established on the west coast of the South Island. The maps that accompany this bulletin give support to the view that the future pattern of land development is likely to be in the application of more intensive methods to farmland already occupied, rather than in the expansion of agricultural frontiers on to the impoverished and poorly drained 'problem' soils that occupy the bulk of lowland Westland.—MURRAY McCASKILL

PHYSICAL GEOGRAPHY AND AGRICULTURE

THE AUSTRALIAN ENVIRONMENT. Commonwealth Scientific and Industrial Research Organisation. Melbourne: Tait Book Co. Pty. Ltd., 1950, pp. 183.

This is not a geography textbook but it will be of the greatest interest to students of geography. It is a handbook prepared for the British Commonwealth Specialist Conference on Plant and Animal Nutrition in relation to Soil and Climatic Factors held in Australia in August 1949, and its purpose was to give workers in the above fields, who were not necessarily familiar with Australia, a general introduction to its physical geography and agriculture. Contributions have been made by specialists in the relative fields, so that here is assembled basic geographic information covering climate, soils, vegetation, agricultural development, water conservation and irrigation, and crops and animals.

The first chapter outlines the structural basis but does not provide the description of the main relief features of the continent which the title 'Physical Geography' would lead the reader to expect. 'Climates of Australia' goes straight to the essentials of the elements of weather and climate as they affect the continent, without detailed regional descriptions for which there is no space. This chapter is simple and clear and has a number of pertinent maps and diagrams.

Soils and vegetation are treated largely by describing the main zones as delimited by Professor Prescott in earlier bulletins of the C.S.I.R. and reproduced here on double-page coloured maps. The zonal treatments are prefaced by short general sections. In the chapter devoted to pastures a similar approach is adopted, with the addition of a section classifying pastures on the basis of climate, and as with soils and vegetation success is largely achieved in the difficult task of reconciling continental generalisations with the facts of detailed local distributions. Writing on 'Development of Australian Agriculture' Professor Wadham outlines five stages of growth and change in agricultural methods and markets, and achieves that nice balance in the assessment of the relative importance of economic and environmental factors which distinguishes his writing on this subject.

The main characteristics of Australian water resources and irrigation, both in a world setting and within the country, are brought out in the next chapter by a shrewd use of statistics in a most useful set of tables and an accompanying concise text. Perhaps the special purpose of the book is more apparent in the last two chapters, 'Field Crops of Australia', and 'Sheep, Cattle and Pigs in Australia', than elsewhere. But the inclusion of technical details does not diminish the value of a certain amount of economic and agricultural geography which is given, although it is true that these subjects have been better covered elsewhere. A minor mistake is the omission, from a density map showing sheep distribution, of a density symbol for southern Victoria and southeastern South Australia. Copiously illustrated, the book contains four coloured double-page maps: one showing orographic features, main rail communications, and main place names referred to in the text; and three others of soils, vegetation and pastures, all based on the most up-to-date information available.

This book should be included in the library of any school or university teaching the geography of Australia, and is indispensable to any teacher or advanced student of the subject. In this second edition of *The Australian Environment* the C.S.I.R.O. has made available a significant contribution to geographic literature.—R. K. Wilson

Town and Country Planning

A CONCISE INTRODUCTION TO TOWN AND COUNTRY PLANNING.

By D. E. Barry Martin. Wellington: A. H. and A. W. Reed, 1949, pp. 123.

The aim of Mr. Martin in presenting his introduction to planning is to 'arouse some intelligent interest in town and country planning'. The keynote of his small book is informality—informality of style, format, and illustration. Much of the time, clarity suffers as a result.

of the natural earth in the first part of the book and the elements of material culture in the second, they insist that 'emphasis has been placed upon the nature or form of the elements of geography, and upon their world distribution' . . . and that 'in some geography books the description of each of the physical features is followed by a survey of the human activities supposedly related to that feature. For example, the study of the physical characteristics of mountains will be supplemented by a description of the activities "dependent on or centred about" mountains. Such a treatment bespeaks a belief that geographical science is primarily concerned with showing how and to what degree physical earth influences human affairs. To such a philosophy of their subject the present authors cannot subscribe.'

Their own philosophy is clearly set out in the first chapter. 'Interrelated earth features exist together in different regions in contrasting associations and patterns. Geography seeks to discover what these regional associations and patterns of earth features are, or in other words, what the various parts of the world are like, how they resemble, or differ from, one another, and why. The principal concern of geography, then, is with the earth's regions.'

The latest edition of their work is presented in entirely new format, clearer to read, without the frequent paragraphs in small print that occurred in earlier editions. Maps and diagrams are more boldly produced and most illustrations have been enlarged. A great improvement is achieved by printing the major world patterns in colour at the end of the book: Climates, Original Natural Vegetation, Soil Regions and Agricultural Regions.

In the text the section on climates is enlarged and 'resource potentialities' of each type of climate are reviewed in a section at the end of each chapter. Other modifications have been introduced which enhance the value of the sections on 'Population and Settlement' and on 'Communications and Trade'.—R. G. LISTER

NATIONAL STOCKTAKING

AUSTRALIA'S RESOURCES AND THEIR UTILISATION, PARTS 1 AND 2. By John Andrews. Sydney: The Commonwealth Office of Education, n.d., pp. 74 and 75.

Australia's professional geographers are few: so too are their published views of that continent's progress and prospects. John Andrews's assessment of the commonwealth's resources and his analysis of the state of their development are therefore very welcome.

These two booklets comprise a discussion course intended apparently for use in adult education classes. There are fourteen discussions, each an objective, carefully-considered statement of the availability of the natural and cultural resources of a continent. Indeed, many may consider these statements too conservative, or even pessimistic. Each survey is furnished with a list of questions for discussion and closer consideration.

Teachers will find here very useful, up-to-date background material for use in courses on Australia. They will find no more concise or recent review of Australia's pastoral, arable, mining, power, manufacturing and service industries. The low price (one shilling and sixpence, Australian currency) should make it possible for every teacher of geography in New Zealand to obtain this survey of our nearest neighbour's resources and their present and possible future utilisation.

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INDEX

VOLUME SIX, 1950

A

A Clarification of Terms, *note*, 201-202
A Concise Introduction to Town and Country Planning (Martin), *rev.*, 213-214
Adam, J. A., 202
Aitken, F. R. G., 81, 103
A Land Despoiled: New Zealand About 1838 (Cumberland), 13-34
  Distribution of Maori population, (maps), 18, 19; Whaling stations, (maps) 24, (photos) 27; Missionary stations, (maps) 24, (photos) 29; Points of European contact, (map), 25; Kororareka, (photo), 31; Otakau, (photo), 31
Allan, R. S., 2
An Eroded Coastline (Speight), *rev.*, 204-205
An Introduction to Social Anthropology, Vol. I (Piddington), *rev.*, 208-209
Annual Report of the Department of External Affairs, 1948-1949, 85
Annual Report of the Soil Conservation and Rivers Control Council (1949), 81
Aotearoa Maori: New Zealand About 1780 (Cumberland) *rev.*, 93-94
Aptornis, 100
Archey, Gilbert, 81, 98
Archibald, E. S., 82
A Textbook of Geomorphology (Worcester), *rev.*, 104-105
Atlas of Geography (Cumberland) *rev.*, 100-102
Auckland, Lord, 110
Australia's Resources and their Utilisation, Parts I and II (Andrews), *rev.*, 216

B

Bagnall, A. G., (ref.), 52
Banks, Sir Joseph, 13, 14
Barr, J., (ref.), 116
Baulig, H., 85, 86, 87
Beattie, H., (ref.), 40
Beilschmiedia tawa, 175
Bell, John, 32
Benson, W. N., 81, 103
Best, E., (ref.), 38, (ref.), 40, 42, 45, (ref.) 47, 48, 50
Black, Leslie, 202
Branch Affairs, N.Z.G.S., 79-80, 198-199
Broughton, Lieutenant William, 8
Buchanan, R. O., (ref.), 54
Buck, P. H., 35, (ref.) 38, 39, 44, 47, 48, 50
  The Coming of the Maori, rev., 96-98
Busby, (James), 43-44

C

Calderas and their Origin, (ref.), 104
Carleton, H., (ref.), 110
Chapman, June, 202
Chatham Exiles, 9
Chatham Island Chronicle, 12
Chatham Islands (Falla), 1-12
  Disposition of component islands, (map), 3; influence of ocean currents on marine life, 5-6; (photos), 6, 7, 11; occupation by Moriori, 6-8; invasion by Maori, 8; European discovery and settlement, 8-12
Clark, Noeline, 202
Climatic Significance of Terraces, *note*, 85-87
Cnemiornis, 100
Cockayne, L., 4, 5
Colenso, William, 17, 21, 24, 35, 40, 42, (ref.) 45
Condition of the Sheep-Farming Industry in New Zealand (McLeod), 72-78
  Reasons for investigations by Sheep-Farming Commission, 72-73; recommendations of interim report, 73; recommendations of main report modified as result of government action, 73; importance of social influences in settlement of back country, 74, 78; recommendations on administration of industry, 74-76
Cook, Captain, 13, 21, 36, 39, 44, 45, 47, 48, 49, 51, 93, 94
Cook Islands (Annual Report 1949), 84
Cook Islands: New Zealand's Tropical Province, 203
Corvus, 4
Corynocarpus, 4
Cotton, C. A., 81, 87, 105
Cowan, J., 132, (ref.) 133, (ref.), 177
Crawford, A. J., 202
Cumberland, K. B., 39, 48, 49, 81, 99, (ref.) 108
  A Land Despoiled: New Zealand About 1830, 13-34
  Aotearoa Maori: New Zealand About 1780, rev., 93-94
  Atlas of Geography, rev., 101-102
  New Zealand in Outline: A Pictorial Geography, rev., 102-103

D

Darwin, (Charles), 33
Demographic Yearbook 1948 (United Nations), *rev.*, 214
Denholm, M. K., 202
Development of Communication Lines Across the Taranaki Uplands (Johnston) 171-189
  Location, (map), 173; Lowlands and Uplands, (photo), 175; Maori trails, (map), 176; Present-day communication pattern, (map), 177; Pioneer farming, (photo), 180; Inland routes, (photo), 185
Development of Hydroelectric Power in New Zealand (Withers), 53-65
  Installed capacity (graph), 55; Pattern of hydroelectric power development, (map), 59; Average weekly water level in Lakes Taupo and Waikaremoana, (maps), 60, 61; Cumulative flow into Lakes Taupo and Waikaremoana (graph), 62; (photos), 66-71

Dick, Mr., 92
Dieffenbach, E., 6, 16, 26, 36, 39, 48, 49, 51
Dinornis maximus, 100
Downes, T. W., (ref.), 40
Dracophyllum, 4
Duff, R., 48, 52
  Pyramid Valley, rev., 99-100
Duncan, C., 202
D'Urville, Dumont, 30, 46, 109
Durward, E., (ref.), 46

E

East India Company, 13
Economic Geography and Geonomics (Robertson), *rev.*, 206-207
Elder, J. R., (ref.), 109
Electric Motive Power Act, 53
Elements of Geography, Physical and Cultural (Finch and Trewartha), *rev.*, 215-216
Emeus crassus, 100
Essentials of Geography (Freeman and Raup), *rev.*, 215
Euryapteryx gravis, 100, 210

F

Falla, R. A., 81
  The Chatham Islands, 1-12
FAO, 214
Farming in New Zealand: Westland (Shepherd), *rev.*, 92-93
Fenton, F. D., (ref.) 41, 45, (ref.) 46, (ref.) 108
Finch, V. C., 206
Finlay, Dr., 103
Fisher, V. F., 48, 52, 200, 211
Fiske, C. A., 207
Fleming, C. A., 5
Florance, R. S., (ref.), 6
Ford, J. H., 202
Forster, —, 36, 94
Fox, James W., 200
  Te Kuiti and the Northern King Country: A Region of Agricultural Transition, 125-153
Fraser, I. M., 81, 85

G

Gage, Maxwell, 200, 205
Gallirallus, 5
Geographic Notebook, 81-90, 200-203
Geological Map of New Zealand. With descriptive booklet *The Outline of the Geology of New Zealand* (Officers of the Geological Survey), *rev.*, 103
Gerrard, J. B., 202
Goldie, W. H., (ref.), 40
Gourou, Professor, 214
Graham, G., (ref.), 40
Grange, L. I., (ref.), 131, (ref.), 174
Growth of a City: Auckland 1840-1950, 190-191, (photos), 192-197
Guthrie-Smith, H., 38, 45

H

Hamlin, —, 35, 36, 48, 51
Hampton, A. W., 103
Hancock, L. M., (ref.), 54
Harding, E., (ref.), 38
Hargreaves, M., (ref.), 110
Harpagornis, 100
Harvey, A. R., 81, 93
Has New Zealand a Soil Erosion Problem? *note*, 81-84
Hawkesworth, J., (ref.), 36, (ref.), 39
Hay, J., 46
Hay, P. S., (ref.), 54
Hector, J., 1
Henderson, J., (ref.), 174
Herbert, W. A., 202
Hickson, T. W., (ref.), 115
High Country Days (Newton), *rev.*, 100-101
Hills, T. L., 202
Hiroa, Te Rangi, see 'P. H. Buck'
Hobson, Captain William, 110
Hochstetter, F. von, (ref.), 108
Holt, E. C., 82
Home, G., (ref.), 41
Hongi, 17
Horsman, J. I., (ref.), 115
Hunt, Frederick, 9
Huntington's theories of climatic change, 85-86
Hydroelectric Power Stations in New Zealand, 54-65, (map), 59

I

ICAO, 214
Impressions of New Zealand Forests and Forestry (Chapman), *rev.*, 205-206
Industry and Employment in New Zealand, *note*, 87-88
Influences of Geographic Environment, (ref.), 215
In Our Contemporaries, 91-95, 204-207
Integral Part of New Zealand, *note*, 203

J

Jobberns, G., 88
Johnston, W. B., 200, 202
  Development of Communication Lines Across the Taranaki Uplands, 171-189
Jones, Johnny, 30

K

Kellog, Dr., 201
Kelly, Thomas, 187
Kooti, Te, 9
Kupe, arrival of in Aotearoa, 44

L

Lake, L. D., 202
Lambert, T., 38
Land Act (1948), 73, 76-77
Land Court Act, 73
Land Use: A World Inventory, *note*, 200-201
Laplace, C. P., 43
Leith, William, 13
Lepine, Constance, 202
Levy, E. B., (ref.), 175, (ref.), 181
Lewthwaite, Gordon, 81, 202
  The Population of Aotearoa: Its Number and Distribution, 35-52
Lister, R. G., 200, 216

M

McCaskill, M., 200, 210, 212
Mackenzie, Jock, 210
McLean, Sir Donald, 132, 172

McLeod, David, 81, 101
  The Condition of the Sheep-Farming Industry in New Zealand, 72-78
McLintock, A. H., (ref.), 45
Maning, F. E., 36, 41, 43, 47
Maori lands, findings on by Royal Commission, 77
Maori proverb, 189
Maori, the, invasion of Chatham Islands by, 8; as farmers in Chatham Islands, 10; impact of Europeans on, 15-23, 25, 32-34, 40-41, 46; population and distribution, (maps), 18, 19, 20-21, 35-52, 108; as farmers in the King Country, 138-140, 146, 149; conflict with Europeans, 41-42, 132-133, 172; intertribal warfare, 17-21, 42-43, 50, 108, 176
  The Coming of the Maori, rev., 96-98
  The Moa-hunter Period of Maori Culture, rev., 210-211
Map Reading in Geography (ref.), 103
Marsden, Rev. Samuel, 16, 32, 109
Marshall, P., 1
Marshall, W. B., 43
Martin, A., (ref.), 114
Marwick, J., 2, 103, (ref.) 127
M. A. Theses in Geography, *note*, 202
Mathew, Felton, 110
Maui, legend of, 44
Metropolitan Auckland 1740-1945: The Historical Geography of a New Zealand City (Pownall), 107-124
  Surface configuration, (map), 109; Maori pa in Auckland district, (map), 111; Distribution of population, (maps), 113, 116, 117; Functional changes in Symonds Street area, (diagram), 119; Index of population, (tables), 120, 124; Functional units in Queen Street, (table), 121, (diagram) 123
Miller, H., 42
Mineral deficiency in the King Country, 130-131, 134
Missionaries, influence on Maori of, 16
Mission Stations, establishment of, in Chatham Islands, 9; in New Zealand, 16, (maps) 24, 25, (photos) 29, 32-33, 132
Montgomery, K. M., (ref.), 145
Moriori, the, 1, 5, 6; origin, 7; modification of traditional pattern of life in Chathams, 7-8; affinities to Easter Island culture, 7; subjugation by Maori, 8; extinction, 9
Morton, J. E., 81, 100
Mulgan, A. E., (ref.), 37, (ref.), 42
Musgrove, S., 100, 209
Myosotidium nobile, 4

N

Newman, A. K., (ref.), 37, (ref.), 41
New Zealand and Asia, *note*, 84-85
New Zealand Company, negotiations for purchase of Chatham Islands by, 8-9; land acquired in Nelson by, 159; settlements sold to Crown, 172
New Zealand in Outline: A Pictorial Geography (Cumberland), *rev.*, 102-103
New Zealand Survey Draughtsmen's Journal, rev., 91-92
Ngata, Sir Apirana, (ref.), 42
Notornis, 100

O

Obituary
  Bowman, Isaiah, *note*, 90
Ongley, M., (ref.), 174

P

Pachyornis, 100
Pacific Island Territories, *note*, 84
Palmer, G. Blake, 38
Parapercichthys colias, 10
Park, J., 160
Patton, Donald J., 81, 84, 106
Petermanns Mitteilungen, (ref.), 89
Petersen, G. C., (ref.), 52
Phormium, 7
Photogeography: A Pictorial Survey of New Zealand
  5. Power: Basis of Progress, 66-71
  6. Auckland: National Metropolis, 192-197
Pitt Island, 1, 2, 3, 4, 5
Planning Outlook, rev., 94-95
Polack, J., 35, 37, (ref.) 38, 43, 46
Pomare, Sir Maui, 10
Population of Aotearoa: Its Number and Distribution (Lewthwaite), 35-52
  Difficulty of assessing pre-pakeha numbers, 35; early estimates, (table), 37; evidence pointing to large population in ancient times, 36-39; causes and extent of depopulation, 39-46; South Island numbers, 46-47; estimates of modern authorities, 48; pattern of distribution, 49-52, (table), 51
Pownall, L. L., 81, 84, 88, 95, 200, 207, 214
  Metropolitan Auckland 1740-1945: The Historical Geography of a New Zealand City, 107-124
Prescott, Professor, 213
Problèmes des Terrasses, 85
Pyramid Valley (Duff), *rev.*, 99-100

R

Rabbit Destruction Council, 77
Rabbit, the, as chief factor in soil depletion, 77
Rangitapua, Te, see 'Tommy Solomon'
Rauparaha, Te, 20, 21, 23, 43, 46, 50
Readers' Choice, *note*, 89-90
Reed, Mr., 103
Report of the Royal Commission on the Sheep-Farming Industry in New Zealand, 72, 81
Reviews, 96-106, 208-216
Rhodes, W. B., 32
Rhopalostylis, 4
Rose, A. I., 200
  Takaka Valley, Northwest Nelson, 154-170
Ross, W. I., 202
Rule, L. A., 202
Rutherford, D., 46, 52, (ref.) 110
Ryan, H. D., 202

S

Sauer, Carl O., (ref.), 162
Seffern, W. H., (ref.), 173
Semple, Ellen Churchill, 215
Shortland, E., 26, (ref.) 44, 45, 46, 48
Shrimpton, A. W., 42
Shrimpton, W. I., 81, 104
Simpson, F. A., 9, 10
Simpson's theory of glacial control, 86

Skinner, H. D., (ref.), 7, 44, 46, 50, 52
Skinner, W. H., (ref.), 40, 50
Smith, A. W., 200, 206
Smith, S. Percy, (ref.), 38, (ref.), 40, (ref.), 42, (ref.), 47, (ref.), 50, (ref.), 108
Soil Conservation and Rivers Control Act, 76
Soil Conservation and Rivers Control Council, recommendations by Royal Commission, 75-76; report of, 82-83
Soil erosion in New Zealand, comparison of reports relating to 81-84
  field conservation trials, 82-83
Soils and Agriculture of Westland, N.Z.(Gibbs, Mercer and Collie), *rev.*, 211-212
Soils and Men, 201
Solander, (Dr.), 13
Solomon, Tommy, 9
Southern Pastoral Lands Commission, 72, 77
Stack, J. W., 46
Stamp, Dudley, 201
Statistical Report on Agricultural and Pastoral Production, 1946-1947, (ref.), 93
Stead, Edgar F., 100
Swainson, William, (ref.), 114
Symonds, Captain, (ref.), 110

T

Takaka Valley, Northwest Nelson (Rose), 154-170
  Location and terrain, (map), 155; vegetation cover, (maps), 157, 159; distribution of population, (map), 163; Takaka township, (photo), 165; Tarakohe cement works, (photo), 168
Taranaki Confiscation Line, 174
Taylor, C. R. H., 81, 94
Taylor, N. H., (ref.), 131, 200, 202
Te Kuiti and the Northern King Country: A Region of Agricultural Transition (Fox), 125-153
  Location, (map), 125; Surface configuration, (map), 127; Central depression, (photo), 128-129; Slumped mudstone country, (photo), 129; Roads and settlement, (map), 131; Land utilisation and stock, (table), 135; Maori land holdings, (map), 136; Distribution of bush, scrub and woodland, (map), 137; Distribution of weed-infested and rough pasture, (map), 139; Typical boundary fence between Maori and pakeha holdings, (photo), 140; Distribution of good and medium quality pasture and cropland, (map), 141; Land use regions, (map), 143; Peatland dairy country, (photo), 144; Maori settlement, (photo), 145; Te Kuiti from the north, (photo), 151
The Australian Environment (Commonwealth Scientific and Industrial Research Organisation), *rev.*, 212-213
The Climatic Factor, (ref.), 86
The Coming of the Maori (Buck), *rev.*, 96-98
The Film Strip and Projector Manual (Reed), *rev.*, 103-104
The Geology of Canterbury and Westland, (ref.), 89
The Half-Yearly Surveys of Employment, 87
The Historical Geography of the United States (Brown), *rev.*, 105-106
The Invasion of New Zealand by People, Plants and Animals (Clark), *rev.*, 98-99
The Life and Times of Sir Julius von Haast, (ref.), 88
The Moa-hunter Period *of Maori Culture* (Duff), *rev.*, 210-211
The Pleistocene Period, (ref.), 86
The Pulse of Asia, (ref.), 86
The Question of Establishing United Nations Research Laboratories (United Nations), *rev.*, 214
The Story of Canterbury (Reed), *rev.*, 209-210
Toi, arrival in Aotearoa of, 44
Tokelau Islands (Annual Report 1949), 84
Travers, W. T. L., 42
Tuckett, (F.), 159
Two New Maps, *note,* 202-203

U

UNESCO, 214

V

Valkenburg, S. Van, 200, 201
Vancouver, Captain George, 8
Vercoe, John, (ref.), 114
Vikings of the Sunrise, 96
Vogel, (Sir Julius), 174
Volcanoes Declare War, (ref.), 104
Von Haast as a Geographer, *note,* 88-89

W

Wadham, Professor, 213
Waharoa, Te, 17-20, 43
Waitangi, Treaty of, 36
Wakefield, Edward Gibbon, 210
Wakefield, (E. J.), 26
Walsh, Archdeacon, 39, 43, 45, 50
Water Power Act (1903), 53
Wayleggo, (ref.), 101
Weller, George, 28, 30
Wellman, Mr., 103
Western Samoa (Annual Report 1949), 84
Westmacott, M., (ref.), 134
Whaling and Sealing
  in Chatham Island waters, 8, 10, 14
  in New Zealand waters, 13, 14-15, 22, (map) 24, 25, 26-30, (photos) 27, 32, 33
Wherowhero, Te, 20, 43
Willett, Mr., 103
Williams, (Henry and William), 37-38
Williams, Rev. Henry, 21, 35, 47, 48, 51, (ref.) 110
Wilson, MacDonald, (ref.), 40, (ref.), 41
Wilson, R. K., 200, 202, 213
Wither Hills, field conservation trials at, 82-83
Withers, L. F., 81
  The Development of Hydroelectric Power in New Zealand, 53-65
Wohlers, J. F. H., (ref.), 43, 46
Wong, P. C. N., (ref.), 107
Wright, C. M., (ref.), 131

Y

Yate, —, 35, 43
Young, Maxwell W., 10

Z

Zonal Soil defined, 201

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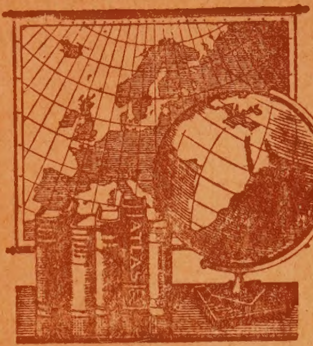

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